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YOUR FARM REPORTER AT WASHINGTON

Friday, March 15, 1931.

NOT FOR PUBLICATION

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U. S. Department of Agriculture

Speaking Time: 10 Minutes.

Dairy Interview: SELECTING AND HANDLING THE YOUNG DAIRY BULL

ANNOUNCEMENT: And now, here is Your Farm Reporter at Washington, again, ready for his Friday chat with dairy farmers. He has been talking this week with his friend A. B. Nystrom, of the Bureau of Dairy Industry; and now he's going to pass on to you some valuable pointers he got from Mr. Nystrom on the matter of selecting and handling the young dairy bull. Ladies and Gentlemen, Your Farm Reporter...

--ooOoo--

A dairy farmer in the Middle West recently wrote to the United States Department of Agriculture as follows:

"I have been following the suggestions of your dairy specialists. I have been improving my herd, by testing and culling, and by better feeding and better management. My herd now averages around 350 pounds of butter a year, per cow.

"But now that I've got production up to that point," he asks, "how do I know that I'll be able to keep it there? I've got to buy another bull; and for all I know he may bring the herd back down to where I started. I'd like to have some suggestions on this point; because I, for one, realize that the sire certainly IS at least half the herd."

Well, in Mr. Nystrom's opinion, this farmer has put the whole point of the question into a nutshell.

What the writer of the letter says, is undoubtedly true; and so it brings the problem of getting a good bull out into bold relief.

"You know," Mr. Nystrom went on, "we recommend, first of all, the use of good proved sires - sires which we know are sure to increase production in the herd. The proved bull is always an old bull; in some places it is hard to get the services of a good proved bull. In the first place, some bulls get mean with age; and very few farmers like to keep an old bull around. And in the second place, many old bulls become non-breeders, through poor feeding or care, and through lack of exercise.

"And so," Mr. Nystrom says, "The next best thing to do is to select the right kind of young bull."

Now, what is the best standard to go by in picking out a young bull?

Well, first of all, Mr. Nystrom asked me to remember this:

What we are interested in, is not so much how good looking the bull is, or how good he seems to be; or even whether he comes from a high-producing family; BUT, in whether this bull has the ability to TRANSMIT high-production to his offspring.

You know, the daughters of some apparently fine bulls are lower producers than their dams, simply because the bull doesn't transmit those factors which make for high production.

Now, you often hear the advice, to choose sires which come from a long line of high-producing dams.

Well, that is all well and good; but is it the most important thing? Is it the point to base judgment on?

Mr. Nystrom says it is not; and here's why. The records of the dams in the pedigree have little relation to the bull's ability to TRANSMIT the desired high producing ability to his offspring.

It would be better to select the young bull whose sire has transmitted high production to his daughters.

In short, it isn't so much the production of the bull's dam that counts; but rather; it is the production of his sisters.

If a large proportion of the young bull's sisters are high producers, it shows that they have inherited from their sire the factors for high production. And so, it is reasonable to expect that the young bull has also inherited the factors for high production; and will transmit high production to his offspring.

Now, of course, if the young bull is out of a high-record cow, that is also to his advantage, especially if she is the daughter of a good proved bull.

To sum up, try to get a line on transmitting ability FIRST. Look at the daughters of the bull's sire, that is, sisters of the bull, as well as daughters of other bulls in the pedigree -- rather than at the dams.

Then, it is also important that the bull come from a disease-free herd, and that he pass the tuberculosis test himself.

And now, let me quote Mr. Nystrom again:

"If care has been taken to select the right kind of young bull," he said, "then he is certainly worth keeping until he is proved; until enough of his daughters are in milk so that you can tell whether he is transmitting high production or not.

Well, of course, this naturally brings up the question of handling and managing the bull. What would you suppose was the first point Mr. Nystrom mentioned on this subject? It was this: Don't let the bull run with the herd. Give him a dry, well-drained comfortable yard to exercise in.

Some dairymen, you know, even provide special equipment for exercising.

Now, as far as bull pens are concerned, I suppose most of you follow one of two plans. That is, you either keep the sire in a special stall in the main barn with the cows, with a door opening into a strongly fenced yard; or you keep him in a separate, specially-constructed building, also with a yard.

In either case, there are several important points to consider; and Mr. Nystrom sums them up like this:

First, make the bull-pen strong enough to hold the most vicious bull with perfect safety.

Second, arrange the doors so that you can let the bull in or out without having to enter the pen.

Third, locate the pen so you can give the bull the right kind of care and attention without waste of time.

Fourth, see that the quarters are well-lighted and well-ventilated.

Fifth, build both stalls and pens so they're easy to clean.

Sixth, build the stall large enough so the bull may move around freely. The usual size seems to be about 12 by 12 feet, but the stall may be larger if you have plenty of room.

Seventh, install a strong stanchion or tie, as well as a feed manger and a feeding alley.

Now, these are the things, stated very briefly, which Mr. Nystrom would do. He put SPECIAL emphasis on the matter of safety first; that is, on taking no chances with any bull, whether or not he seems harmless. It is a matter of record, he remarked, that bulls which seem dangerous actually harm fewer people than so called gentle bulls. The bulls that become vicious suddenly are the ones after all, which do most of the damage.

Well, what I've told you about my interview, of course, is just very much of a bird's-eye-view of the problem. If you're interested in getting

details on any of the questions I've brought up, you'll probably find what you want in the bulletin called "Care and Management of Dairy Bulls." It is Farmers' Bulletin No. 1412-F.

ANNOUNCEMENT: Ladies and Gentlemen, you have been listening to a report by Your Farm Reporter at Washington on the subject, "Selecting and Handling the Young Dairy Bull." If you want copies of that bulletin, write either to Station _____ or direct to the United States Department of Agriculture in Washington, D. C. The title, again, is "Care and Management of Dairy Bulls, and the number is Farmers' Bulletin 1-4-1-2.

U. S. Department of Agriculture

YOUR FARM REPORTER AT WASHINGTON

Monday, March 2, 1931

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

All Regions.

THE SPRING CARE OF FARM HORSES.

OPENING ANNOUNCEMENT: Ladies and gentlemen, Station _____ presents Your Washington Farm Reporter in a LIVESTOCK program broadcast in cooperation with the United States Department of Agriculture. The Reporter's subject for to-day is THE SPRING CARE OF FARM HORSES. All right, Mr. Reporter.

---oOo---

Folks, I want to talk to you for a little while to-day about taking care of the horse that pulls the plow on many of the six million farms in this country. This is the second day of March, and it won't be long until millions of horses and mules will be preparing the soil for the 1931 crop.

I'll admit that this is a day of automobiles, airplanes, radios, and machine farming, and that these things are wonderful and have a place on many farms, but I would also like for you listeners to remember that the horse is still responsible for much of the farm crop production in this country.

"Old Dobbin" still plays his part in the New England orchards, and the lazy mule continues to flop his ears in the southern cotton fields, while modern draft horses keep up their steady pace in the great Corn Belt. Many western farmers have so much land that they use everything from horses to airplanes, and even then seldom see the back side of their farms and ranches.

In the final analysis we find that "Old Dobbin" and his kinfolks play an important part in the production of our corn, cotton, tobacco, sweetpotatoes, and other general farm crops.

When I want first-hand information about horses or horse problems I go over and have a talk with John O. Williams who is in charge of Uncle Sam's horse-husbandry office.

I asked Mr. Williams the other day how many horses and mules we had in this country, and now I'm wondering if you could answer that question.

"Well," he said, "I haven't counted them all since New Year's day in 1931. At that time there were estimated to be about 14,000,000 horses on the farms of this country, and nearly five and a half million mules, or a total of nearly 20,000,000. That's an average of about 3 work animals per farm for the six and a half million farms listed in the 1920 census report."

Next, I asked Mr. Williams if horses should be conditioned for the spring farm work.

"Yes, indeed," was his quick reply. "You see," he continued, "a horse that has been idle most of the winter is comparable to an automobile that has been standing under the shed for about a month. It may be all right to make a long trip in the car, but it would be wiser to look the machine over, fill the radiator, inflate the tires, examine the oil, and then get in the car and drive it around the barn a few times to get it limbered up before you put 'er in high out on the highway.

Now it may be all right to take the unseasoned horse out of the spring pasture and put him to plowing in the orchard, in the field, or elsewhere, but it would be much better to condition him for a few weeks before calling on him to go up against the collar from sunup to sundown."

"What do you mean by conditioning a work horse?" I asked.

"Well," he said, "farm horses need to be broken in to spring work slowly, their feed and water need to be adjusted to the work, and their shoulders and backs need to be carefully watched and not allowed to become sore before they are tough enough to stand up all day under a heavy load. That's what I mean by conditioning a horse for spring work."

And now here's the outline Mr. Williams gave me for conditioning horses and getting them ready for spring and summer work.

"We'll start with the MAN," he said. "When a man has the ability to keep horses in good condition so that they are ready when needed, he is a good horseman. Naturally, such a man generally keeps horses in a clean, dry stable, knows the individual requirements of each animal, and keeps them in good physical condition."

A clean stable, a clean horse lot, and a clean pasture will all help to keep the horse's feet in good healthy condition, and of course, the horse must have good, sound feet for best results.

Horses may be fed large quantities of roughage during the winter months when they are idle, but this should be reduced and supplemented with concentrates gradually as the horse is put on farm work in the spring. The use of large amounts of roughages during the work season ought to be limited to periods of rest.

The amount of grain and hay required by the farm work horse depends, among other things, on the kind, regularity, and speed of the work performed.

Next, place horses in the hitch where they will be most efficient and best satisfied. Slow horses belong at the "wheel" and fast horses in the lead. If this order is reversed, it upsets the whole team, and the driver, and sometimes the work.

Try to have a harness for each horse. Fit this harness to that horse and use them together throughout the season if possible. Keep the harness in good condition, make adjustments when necessary, and try to make the horse comfortable, especially when working.

Watch the shoulders when horses start work in the spring. If these are toughened up slowly without injury, you can call yourself a good horse-man. If the horse is rushed to work in the spring and his shoulders become sore, you can call yourself whatever you please, but a horse with a sore shoulder in the spring of the year when the plowing is behind is often worse luck than a black cat crossing the road in front of you.

When the harness is taken off, wash the horses shoulders with warm water and castile soap, and rinse with cold water to which a small amount of salt has been added. This treatment may be discontinued after two or three weeks, after the shoulder muscles have hardened and the winter hair has shed off, but careful daily grooming and cleaning of the collar are ALWAYS required.

A little shoulder attention in the field----is time well spent. Raise the collar frequently and clean the sweat, dirt and dead hair from both the shoulder and collar. Lift the collar forward on the neck and leave it there a few moments, so that the shoulder surface may cool off. It is especially important that the neck and shoulders be cleaned and given a chance to dry and cool off during the noon hour.

A horse ought to have sound feet. Shoeing work horses is not necessary at all times or on all farms, but the feet should be kept trimmed and in good condition so that the horse will be comfortable and can hold his footing without stumbling and falling. Shoeing is always necessary if much road hauling is done.

It is considered good horse management to "FLOAT" or file the teeth when necessary. This operation often makes a good horse out of one unfit for work. A veterinarian should be consulted relative to this matter. Bad teeth often result in indigestion, and this upsets the system, and that puts a horse out of commission, and often when he is badly needed.

Now folks, I'll have to saddle my own horse and go on home because my time is up and because I have other work waiting for me at home, but I have not covered one-tenth of the valuable information Mr. Williams gave me on breaking horses in to the spring and summer work campaign.

I'm sure many of you listeners will want more information on this valuable subject, and if you do, I'm going to ask you to write me in care of this station and ask for a copy of Farmers' Bulletin No.1419-F, on CARE AND MANAGEMENT OF FARM WORK HORSES, and Farmers' Bulletin No.1535-F, on FARM HORSESHOEING.

In closing I would like to say that Farmers' Bulletin No.1419-F contains information that, if followed, should prevent sore shoulders in 95 cases out of a hundred.

--ooOoo--

CLOSING ANNOUNCEMENT: You have just listened to one of Your Farm Reporter programs broadcast from Station_____in_____through the cooperation of the United States Department of Agriculture. If you want the two bulletins mentioned,---Farmers' Bulletin No.1419-F, on CARE AND MANAGEMENT OF THE FARM WORK HORSE, and Farmers' Bulletin No.1535-F on FARM HORSESHOEING, write this station or the United States Dept. of Agriculture in Washington,D.C

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YOUR FARM REPORTER AT WASHINGTON

Tuesday, March 3, 1931.

CROPS AND SOILS INTERVIEW NO. 9: Insects and the Drought.

ANNOUNCEMENT: You have heard a good bit about the effect of the drought on farmers and farm crops in some sections. Now your farm reporter at Washington is going to tell us about the effect of the unusual weather conditions on the insect pests --- The insect specialists of the United States Department of Agriculture say that weather has a lot to do with the numbers of our chief insect enemies ----- Isn't that right, Mr. Reporter?-

Yes, Mr. J. A. Hyslop, in charge of the insect pest survey, of the United States Department of Agriculture, has been showing me how the crop insects have been hit by the Big Drought.

Mr. Hyslop has the spread of all our chief insect pests mapped out. With a glance at his maps of the country, you can get a fair general picture of where the different pests are, and where they are worse. He gets reports on conditions all over the country.

Of course, the number of insects in most any region varies from year to year. And the weather cuts considerable figure in that variation. Ordinarily, how much of the change is due to weather conditions and how much to other conditions it is hard to say. Now this last year, Mr. Hyslop says there was little in the way of unusual changes in the extreme West, and extreme Northeast and Southeast, but in the drought areas, the hot, dry weather had a very striking effect on many of our major farm crop insects.

When you consider that all the country east of the Rockies except those northeast and southeast tips, was more or less affected, you realize that a lot of good farming country which suffers heavy damage from insects of one kind or another every year, was involved in that Long Dry Spell. The Ohio River and lower Mississippi River Valleys, and Maryland and Virginia, suffered most. Naturally, the biggest effects on insects was in that territory.

In some cases the effects on the insect population may last for several years. And, of course, we'll know more about just what the effects of the drought during the past months were after next summer, when we can

better check up on the numbers again,"after taking"that big dose of unusual weather.

However, Mr. Hyslop says, the effect of the drought on the Mexican bean beetle is already evident. You know, the Mexican bean beetle is a native of our southern Rockies and the mountains of Mexico. But in 1919, some beetles got shipped into Alabama, and since then have played hob with beans and many other vegetable crops in a territory which has been increased year by year until bean beetles now infest much of the South and East up into New England.

The hot, dry weather last summer, however, simply cooked bean beetles' eggs. All through early July, Mexican bean beetles were quite generally reported throughout the infested territory. It looked as if these insects would multiply and do their usual damage and make a further spread into new territory. But with no moisture in the upper layers of the soil the ground got so hot that the eggs and young of the Mexican bean beetle perished. The bean beetle practically disappeared as an important pest over much of its recently acquired range.

Except for a little spread in Massachusetts, they seem to have occupied no new territory.

On the other hand, the codling moths, which had come through the winter in above normal numbers in the Pacific Northwest and had suffered heavy mortality in parts of Illinois, began to pick up and by the middle of July were emerging in threatening numbers in the East-Central States.

The unusually hot, dry weather over a great deal of the country seemed to stimulate the codling moths. They did very severe late damage over most of the drought sections. In the Pacific Northwest, however, late infestation was below normal.

You see what is one bug's poison is another's meat and drink, as the saying goes, even if there is little to drink.

The hot summer and mild fall also seemed to favor the big increase of the San Jose Scale in central and southern Illinois. The European red mite also showed a decided increase over much of the eastern part of the United States.

However, the now famous European corn borer had its spread considerably checked by the drought. The damage was lighter than expected and corn borer scouts found that this pest had occupied little new territory.

But before we start rejoicing over what the drought did to slow up the borers, it might be well to note, that among the few new places occupied is one in Kentucky on the south side of the Ohio at a considerable distance from other infestations. The entomologists think those corn borers got there by the water route from lightly infested sections of southern Ohio.

Then, too, Mr. Hyslop says, because insects disappear as an economic pest for a season, is no sign they are gone for good. Insects may be down, but they are never altogether out. Some few always survive in protected places. And the fact that most of their kind have been killed off helps them to come back and come back quick. There is less competition for the food supply. Under such conditions they can multiply fast.

It is astonishing how fast they can multiply, when natural checks against them are removed or even slacked up a bit. One scientist, Mr. Hyslop mentioned, kept track of the reproduction of a certain kind of small fly found in India. He calculated that if the progeny of a single pair of those small flies could all survive and reproduce at the maximum rate for those insects under the best conditions, and that if each insect's body remained intact after its demise, in one year's time, India would be buried nine miles deep under the bodies of those flies.

Another careful calculator made similar estimates as to the multiplication of a pair of aphids. With nothing to check them, he figures that in twenty years, there would be enough of those plant lice to fill up the Atlantic Ocean.

He may have been off a few aphids in his calculation, but we are very thankful Nature keeps the brakes on. Not one insect out of a thousand ever even survives to lay an egg, Mr. Hyslop says. And the eggs don't all hatch by any means. And mighty few of the "young hopefuls" that hatch out live to grow up. Life insurance premiums in "bugdom" would be pretty high! However, there is always a surplus of insects. Even after weather changes and other factors have taken their toll. There are always enough left, to quickly multiply, into a crop menace.

For that reason, Mr. Hyslop warns us not to get the idea that because such pests as the Mexican bean beetle and corn borer and other insects have diminished in numbers under unfavorable conditions, they will long remain that way. Sad to say, they will be back in full force. We must keep up the fight to protect our crops.

ANNOUNCEMENT: Your farm reporter at Washington has just reported on the effects of the drought on some of our chief insect pests, as outlined to him by Mr. J. A. Hyslop in charge of the Insect Pest Survey of the United States Department of Agriculture.

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YOUR FARM REPORTER AT WASHINGTON.

U. S. Department of Agr
Wednesday, March 4, 1931.

NOT FOR PUBLICATION.

Speaking Time: 10 Minutes.

All Regions.

PRODUCING GOOD HATCHING EGGS.

OPENING ANNOUNCEMENT: At this time Station _____ presents Your Washington Farm Reporter in one of his regular POULTRY talks. This broadcast comes to you through the cooperation of the United States Department of Agriculture. All right, Mr. Reporter.

--ooOoo--

Well folks, I want to talk to you for a little while to-day about hen eggs that don't hatch as well as those that do hatch. I'm told that nearly one-half of all the eggs set in this country fail to hatch. According to the best available records there are around two billion eggs set in the United States every year. If 60 per cent of these eggs hatch, that still leaves 800 million eggs that DON'T hatch. There must be some reason or perhaps several reasons for such a loss as this.

This is the fourth day of March--- the day when new Presidents are sworn in--- and the day when Washingtonians look forward to a great event and wonder what the weather will be. However, we're not swearing in a new executive this year--- but the day is still important to poultry raisers because this is the time when plans are being made for hatching next year's layers, and what we do or what we fail to do now influences the number of eggs that hatch, or that fail to hatch, this spring.

I asked Mr. A. R. Lee, our poultry friend over in the Department of Agriculture, what caused this great loss in hatching eggs.

He replied that a large part of the loss is due to the presence of many LOW-QUALITY hatching eggs. I asked if he meant infertile eggs when he mentioned low-quality eggs.

"No, not necessarily," he replied. "Many fertile eggs fail to hatch even under the best conditions of incubation. There are other factors besides fertility."

"What are they?" I questioned.

"The answer is not so easy," he replied. "In the first place hatchability is an inherited characteristic. So the problem shifts to better breeding and selection. That's why we are cautioned to be so careful in culling the breeding flock. It isn't always the fine-looking hen that produces the greatest

number of hatchable eggs. For instance, yearling hens make better breeding than pullets because they are more mature, lay larger eggs, and generally have a rest period during the fall. However, early hatched pullets which have been through a fall molt, make good breeders."

Inbreeding is a factor of considerable importance in the production of good, hatchable eggs. Any stock which has been closely inbred does not produce the best hatching eggs.

Feeding is also important in the production of hatchable eggs. Rations which keep the flock in PRIME PHYSICAL CONDITION usually result in the best eggs for hatching. Such rations contain plenty of protein, minerals, vitamins, green feed, milk and even BULKY feed. For instance, experiments show that calcium, or lime, in the ration not only affects the quality of the egg shells, but indirectly, the quality of the chick produced. Good shells, are, therefore, absolutely essential in the production of good hatching eggs.

Mr. Lee said that the Department of Agriculture had found that alfalfa hay and milk were the two feeds which produced the greatest improvement in hatchability. Ground wheat and ground corn are also good additions to the rations of the breeding flock. Mr. Lee gave me a good, breeding-flock ration, but instead of trying to give figures over the radio, I'm going to offer you a bulletin at the end of this talk which contains a number of good rations. Get a copy of this bulletin right away and then you can select the ration best suited for your conditions and flock.

Hens out of doors on a green range usually produce good hatching eggs. But in most parts of the country they can't get green range early in the breeding season, so a substitute of green cabbage leaves, carrots, lettuce leaves, sprouted oats, alfalfa or clover hay and soy bean hay is recommended.

Direct sunlight is another thing which influences the hatchability of eggs. Hens deprived of sunlight produce less-hatchable eggs than hens given the benefit of direct sunlight. This has been demonstrated over and over in experiments at the various State experiment stations and by the Department of Agriculture at its poultry farm near Washington, D. C.

Many poultrymen who are unable to get direct sunlight on their breeding flocks overcome this handicap to some extent by using cod-liver oil in the ration. An addition of one per cent of cod-liver oil to the ration is about the right amount to use where birds are deprived of direct sunlight.

Glass substitutes which admit the much talked of ultra-violet light rays are a help in producing good hatching eggs. However, the use of lamps or lights that produce artificial ultra-violet rays is still in the experimental stage.

Mr. Lee reminded me that sanitation is a very important item in the production of good hatching eggs. Houses must be kept clean, dry,--- and the litter must also be clean, and changed at frequent intervals..

I asked Mr. Lee how long the rooster should be with the breeding flock before the eggs would be hatchable.

He replied that two weeks was little enough and that three weeks would be better.

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If there are too many hens for the number of roosters, naturally, some of the eggs are not going to hatch. In the case of Leghorns or other small breeds--- one male is mated with about 15 hens. In larger breeds the proportion is about one male to 10 or 12 hens. In the case of large matings, 5 or 6 Leghorn roosters, or 7 or 8 general-purpose roosters, are mated with each hundred hens.

Sudden cold spells are quite common in many sections of the country during the early part of the hatching season. That brings up the question of keeping hatching eggs at a uniform temperature. If the weather is cold enough to chill eggs--- then they should be gathered two or three times during the day to prevent this because chilled eggs will not hatch well.

After the eggs have been gathered Mr. Lee says that it's important that they be kept in a cool, but not a cold place. Kitchens are not, as a rule, a good place to keep hatching eggs because the kitchen is usually hot and dry.

I asked Mr. Lee how long it was safe to hold hatching eggs before setting, and he replied that 7 days was about the limit for general conditions throughout the country. He then stated that the extreme limit would be 2 weeks of age, but that hatchability decreased rapidly as the age of the egg increased.

One of the easiest ways of improving hatchability in eggs is by selecting good eggs to set. In the selection of good setting eggs, SIZE is one of the most important factors. Many poultrymen discard all hatching eggs that weigh less than 2 ounces--- that's 24 ounces for a dozen, or 30 ounces for a setting of 15 eggs. Color and shape are also important in selecting hatching eggs. White eggs, for instance, should be PURE white, and not tinted with brown.

Early hatches produce layers that provide mighty good eggs for hatching purposes. Last year's early hatch, and last fall's early egg record emphasize the value of early hatches.

It isn't worth much to go to the trouble of producing good hatching eggs unless you expect to incubate them in a good, clean incubator, or in a clean nest and house. I had planned to say something on this subject, but my time is about up so I'll have to save that for another day.

If you want information on the production of good hatching eggs from the feeding standpoint, ask for a copy of Farmers' Bulletin No. 1541-F, on FEEDING CHICKENS. If you already have a copy of that bulletin read the section on feeding the breeding flock.

--ooOoo--

CLOSING ANNOUNCEMENT: You have been listening to Your Farm Reporter broadcast his regular POULTRY program from Station_____ in cooperation with the United States Department of Agriculture. Drop us a line if you want a copy of Farmers' Bulletin No. 1541-F, on FEEDING CHICKENS'

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1. The first part of the paper
is devoted to a general
discussion of the problem
of the existence of a
solution of the system of
differential equations

which are satisfied by the
functions y_1, y_2, \dots, y_n
which are solutions of the
system of differential equations

and the functions y_1, y_2, \dots, y_n
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which are solutions of the
system of differential equations

FEB 25 1931
U. S. Department of Agr

YD YOUR FARM REPORTER AT WASHINGTON.

Thursday, March 5, 1931.

NOT FOR PUBLICATION

Federal Farm Board Interview No. 10: Recent Developments in
Apple Cooperatives.

ANNOUNCEMENT: Your farm reporter at Washington again reports to us on the great cooperative marketing movement fostered by the Federal Farm Board! Today he is going to tell us something of the recent developments in apple growers cooperatives. --- All right, now for the report! -----

It seems there has been quite a bit of development in cooperation among apple growers, recently.

Mr. Ralph W. Rees, of the fruit and vegetables section of the Federal Farm Board, has been telling me about it.

But before we get to talking about new associations, and old associations taking on new members, let's take a general glance around and notice where the apples and apple associations are.

Mr. Rees points out to us that the commercial apple production in this country is about evenly divided, between what we call the box-apple States of the Pacific Northwest, and the barrel-apple States east of the Rocky Mountains.

When it comes to apple-growers associations, however, the division is not so even. A much larger per cent of the Pacific Northwest apples are handled through cooperatives.

Of course, there are good reasons for that. The more thorough co-operation in the box-apple states is, first of all, due to the greater distance from market. Growers in the Northwest had to organize.

The apples of the Pacific Northwest are grown for the most part in small, individual orchards and there are a great number of such orchards concentrated in the same sections.

Then, too, large orchard areas came into bearing within a short time, whereas in the East the increase has been more gradual.

As a result of these and other factors making for cooperation, the volume being handled by the associations is gradually increasing.

Those Northwest organizations have accomplished a good deal. They have brought about better standardization of apple grading; and wider and more uniform distribution both in the domestic and in the export markets; and they have even stimulated demand through standardization and advertising.

On the other hand, the barrel-apple States of the East have no large associations such as those performing such services for the Pacific Coast apple growers.

However, there are a number of local apple associations scattered through the barrel-apple states, and Mr. Rees says a number of them are increasing their volume right along now. And a number of new locals are organized each year.

Last year, there were five new associations organized in the famous Shenandoah Valley. Three of those received assistance from the Federal Farm Board. It now seems that there will be several additional associations organized in the Valley and ready to open with the 1931 crop.

In Michigan, Mr. Rees reports, the ten local associations there have materially increased their membership during the last year and are now federated through one sales agency this year.

In Illinois, an association, which has operated for a number of years, principally as a peach association, is now organizing an apple association in western Illinois, and will materially increase its apple tonnage during the coming year.

New York State has fifteen local apple packing associations, some of which, Mr. Rees says, will probably use a common sales agency during the year.

In Massachusetts, an association this year more than doubled its previous volume and is now handling about 195,000 boxes of apples.

In Maine, a survey is being made in several apple districts to determine whether there is enough volume of high quality fruit being produced to warrant the organization of a cooperative association. The indications are now that a few apple associations will be formed in the Pine Tree State.

As Mr. Rees explains, the Federal Farm Board policy is to encourage existing local associations to increase their membership and volume, and also to encourage the formation of new cooperative associations in localities where conditions seem to be favorable to their successful operation.

When there are enough locals in a given production territory to federate into sectional or regional organizations for greater unity in standardizing pack and grade, and reducing market expense through the use of a common sales agency, the Federal Farm Board encourages that further step.

In the Eastern States, the apple growers nearness to market has given them outlets for their apples at some price, and has tended to retard co-operative development and to increase its problems.

However, Mr. Rees is emphatic in saying that the advantages of co-operative apple marketing in the East are just as great as they are in the West. Better standardization and improvement in packs are greatly needed. Concentration of large volumes of apples of like variety and grade, he points out, would attract large buyers for both the export and domestic markets.

As I got the general picture of our western box-apples and our barrel-apples of the East, the reason the Pacific Northwest growers have taken the lead in cooperation is because the immediate need was greater and the problems of packing and standardization much less in the East.

The Northwest apples are grown under more uniform conditions, and naturally are a more uniform product. At the same time, the keen competition both in the domestic and export market and the increasing demand for quality fruit make it imperative for Eastern apple growers to cooperate in the improvement of their packs, the standardization of their product, and in the selling of their product.

ANNOUNCEMENT: Some of the recent developments among apple growers associations have just been presented to you by Mr. Ralph W. Rees of the fruit and vegetables section of the Federal Farm Board, through your farm reporter at Washington. Station _____ cooperates with the United States Department of Agriculture in bringing you this report.

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★ FEB 25 1931 ★

U. S. Department of Agriculture

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In 3/10
YOUR FARM REPORTER AT WASHINGTON

Friday, March 6, 1931.

NOT FOR PUBLICATION

Speaking Time:

Dairy Interview: BUSINESS METHODS IN 1931 DAIRY-FARMING.

ANNOUNCEMENT: And now, ladies and gentlemen, here is Your Farm Reporter at Washington, with another report for dairy farmers. He has been talking with Mr. J. E. Dorman, of the Bureau of Dairy Industry, about the business side of dairy farming---and he's going to tell you about this interview today, with an eye especially to the situation during the coming year. All right, Mr. Reporter.....

I suppose all of you dairymen are familiar with the Outlook Report. You will remember the report puts a great deal of emphasis on the necessity for doing three things, during 1931: Careful selection of milk cows----rigid culling of low producers----and greater skill in feeding and management of dairy herds.

Well, now let me quote you the first words Mr. Dorman said to me, when I sat down across the table from him, pencil in hand:

"There has never been a time in history," he said, "when good business methods were more important in dairy farming than they are now."

I don't need to go into the reasons for this. A cow producing only 200 pounds of butterfat a year, may, under certain conditions, produce a little profit for her owner, but under conditions like the present, she may not only not return any profit at all, but she may even be losing the dairyman money to keep her in the herd.

Mr. Dorman put it this way. Suppose butterfat sells at 40 cents, and a cow produces 300 pounds of butterfat a year. The gross income is \$120. And now, suppose the price of butterfat drops to 30 cents. Then the same cow must increase her production to 400 pounds to bring her owner the same gross income.

Now, as you know also, there is at least one bright side to the price situation. That is, feed prices are likewise low. Assuming that they are

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10 per cent lower, the same amount of money will buy 10 per cent more feed.

Mr. Dorman's point is, that if the cows are the right kind of cows, this extra feed can be used to increase their production---at no extra expense.

In other words, feed the good cows well, and cull out all the cows which are not capable of responding to better feeding. Feeding for high production is a waste of good feed, unless the cow has inherited the ability for high production.

The cows to cull from the herd are the cows which are born low-producers and can never be anything else.

But, on the other hand, it would seem like good business to give the cow a chance, before condemning her to the butcher. Many cows which might be high-producers are actually low-producers, simply because of the wrong kind of feeding and management.

And, of course, if you're going to know which cows to cull and which to keep---which ones will be profitable despite the low prices, and which ones will be boarding at your expense---you need to keep records: Records on both production and feeding.

This is what Mr. Dorman means, first of all, by business methods.

In fact, he declared that keeping business records was the necessary basis of all herd improvement.

It is the basis, of course, of the work of our Dairy Herd-Improvement Associations.

Now, the average butterfat production of all cows in the United States is somewhere around 180 pounds. The average of the half-million or so cows in Dairy Herd-Improvement Associations is 296 pounds---more than a hundred pounds per cow above the average for the whole country.

"Now, just look at this situation a minute, "Mr. Dorman suggested.

"If all the cows in the United States produced as much, on the average, as these cows in Dairy Herd-Improvement Associations, 14 million cows would produce the same amount of butterfat that it now takes 22 million cows to produce.

"We could eliminate about 8 million, or practically one-third, of our cows, and still have just as much butter as we have now.

"Just think of the feed and labor this would save. Speaking of less work and more pay, this is really one way of getting it."

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Then, there's another way of looking at the same situation. New records which have just been tabulated by the Bureau of Dairy Industry, show the following interesting facts and figures:

Cows producing only 100 pounds of butterfat a year, paid their owners only about \$14 a year above cost of feed.

Cows producing 200 pounds returned \$54 a year over cost of feed; 300 pounds, \$96; and 400 pounds, \$138.

In other words, the 400-pound producer returned 10 times as much over cost of feed, as the 100-pound producer.

Now, here's your chance to keep 10 cows in 1 cowhide.

It's a good trick if you can do it---and it CAN be done. Mr. Dorman can cite you hundreds of cases he knows about personally, in which it has been done.

Again, the first step, and the most essential step, is to keep records.

Mr. Dorman told me of a case he ran on to in a dairy community in Ohio.

"It seems strange," he remarked, "that two men living in the same locality, seemingly under the same conditions and with seemingly equal opportunities, can get such widely different results in dairy farming.

"One of these dairymen had been in the business for 10 years, and he had worked hard---very hard. At the end of this time he had a herd of 28 cows, with an average butterfat production of 261 pounds. The average feed cost was \$64, and the income over cost of feed per cow was \$40.

"Now, the other fellow, who lived down the road just about a mile, owned only 15 cows. But, the yearly butterfat production of these 15 cows averaged 401 pounds. His feed bill was \$15 more than his neighbors, being \$79 per cow, but the income over cost of feed was more than twice as great---\$81 per cow as compared with \$40.

"So I found this man with 15 cows making more than twice as much money per cow as his neighbor with the 28 cows."

Well, after this situation was disclosed, through the records on these two herds, we followed it up to see where the difference came in. We found the man with the 15 high-producing cows had done one thing which his neighbor hadn't done. He had always been especially careful in selecting his herd sires. He chose only the sires which came from a long line of high-producing dams .

The other man had worked just as hard, or harder. But apparently he had not realized the importance of being so careful in picking out a good proved sire to head his herd.

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As a result he was caring for almost twice as many cows for approximately the same income.

This is just one actual case. As I say, Mr. Dorman can tell you about hundreds of similar cases he has come across, in his visits with dairy farmers all over the country.

Let me repeat now, in closing, Mr. Dorman's opening remark: "There has never been a time in history, when good business methods were more important in dairy-farming than they are now."

To sum up, good business methods mean, first of all, keeping accurate records on feeding and production.

And then, on the basis of these records, it is good business to select your milk cows carefully---cull out low producers rigidly---and feed and manage the herd as efficiently, and skilfully, as possible.

It is always good business to do these things; but, as Mr. Dorman remarks, it is especially good business now.

ANNOUNCEMENT: Ladies and Gentlemen, you have been listening to Your Farm Reporter at Washington, bringing you the results of his interview with Mr. J. E. Dorman, on "Business Methods in 1931 Dairy-Farming." If you would like to have more information about Dairy Herd-Improvement Association work, write for the publication called "Dairy Herd-Improvement Associations---and Stories the Records Tell." It is Farmers' Bulletin No. 1604, and it will be sent to you free, as long as the supply lasts. Write either to Station _____ or to the U. S. Department of Agriculture in Washington, D. C.

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YOUR FARM REPORTER AT WASHINGTON.

Monday, March 9, 1931.

NOT FOR PUBLICATION

★ MAR 16 1931 ★

U. S. Department of Agriculture

Speaking Time: 10 Minutes

All Regions.

OPENING ANNOUNCEMENT: Every Monday Your Washington Farm Reporter interviews some livestock specialist in the United States Bureau of Animal Industry and then broadcasts the results of that interview for the benefit of you livestock producers out in the field. The Reporter's subject for today, is the SELECTION OF EXHIBITION AND BREEDING HOGS. All right, Mr. Reporter.

--ooOoo--

Well folks, I want to talk to you for a little while today about the selection of exhibition and breeding hogs. I visited with a Virginia livestock farmer last week end and while there heard quite a discussion on the TIME of selecting pigs for breeding and show purposes. One prominent hog raiser was of the opinion that breeding pigs ought to be selected pretty soon after farrowing. Another prominent producer felt that the selection ought to be made along about weaning time.

Well, that discussion put me to thinking----and as I came on home it occurred to me that perhaps many of you hog raisers who listen to these radio talks might be interested in a discussion of the same question. So the next day I went in search of Mr. E. Z. Russell, in charge of hog investigations for the United States Department of Agriculture.

I arrived at Mr. Russell's office a little early in the morning and took a seat outside to await his coming, but I had hardly hit the chair when a big Nebraska hog-calling voice yelled out----"Come on in, Mr. Reporter."

After passing the time of day and looking around at the new hog pictures on the walls in his office, I told him what I wanted----information on the TIME of selecting exhibition and breeding hogs.

"Well, I'll tell you," he said, "my experience has been that it pays to take good care of the brood sow BEFORE SHE FARROWS the pigs that are to walk the sawdust trail in the show ring or be kept for breeding purposes.

"Then you's begin the selection before weaning time?" I questioned.

"No," he said, "you're on the wrong trail. You're not even warm. What I mean is that I would take mighty good care of the sow before farrowing time---because that often influences the kind of pigs farrowed. Of course, it pays to select the best individuals from a litter or from a great number of pigs, but the hog raiser who wants to win year after year in the show ring as well as in the breeding pen, needs to go back behind the pigs and select a good dam to farrow these pigs. After this selection has been made, and the dam has been bred then it's up to the owner or manager to take good care of her from the time she is bred until the pigs are farrowed and weaned."

"Why do you place so much emphasis on the care of the sow?" I asked.

"Because it's so important," he replied.

"How is it important?" I questioned.

"Well, I'll tell you," he answered. "I used to raise hogs on a farm out in Nebraska, and I still raise hogs now on the Government farm near Washington, and I have found that it pays to take care of the sow that is to farrow the pigs whether they are produced for the show ring, the breeding pen, or the sausage mill. For instance, a sow in good condition at farrowing time, and well cared for until the pigs are weaned, will give every pig an even opportunity to grow and develop according to the ability of the individual pig. If a pig has responded to good treatment from farrowing to weaning time, is in good condition, and looks promising say a few weeks after weaning, then that's an indication of the pig's ability to use feed in the right way, and hog raisers are, as a general rule, fairly safe in selecting such pigs.

On the other hand, a sow in poor condition at farrowing time, and one which continues in poor condition while suckling her pigs, finds it difficult to give every pig an even chance. This may result in some pigs showing to a real good advantage and others at a decided disadvantage at weaning time. A selection on that basis seldom proves as satisfactory as seeing that the sow is properly managed so that every pig may have a fair chance."

Mr. Russell considers a good pasture almost necessary in the proper development of a pig.

Pigs intended for showing at the fall fairs and exhibitions must, as a general rule, be farrowed ON OR SOON AFTER March first. Other things being equal, it's important, therefore, to have show pigs farrowed as close to March first as possible. Pigs farrowed, say about the middle of April or first of May, would not, as a rule, show size, spread, and development by fair time quite as well as those farrowed on or a few days after March first. In other words, extremely late-farrowed pigs show at a disadvantage when compared to early farrowed pigs, but under fair regulations they have to show in the same class. A judge looks at an early farrowed pig which is well developed, and then at a late farrowed pig which is naturally not so well

developed because it hasn't the age. Yet he must decide and place each pig where he thinks it should stand in its class. Under the circumstances the judge is apt to say in his own mind---well, one pig is well developed and I can see what it is---the other pig looks like it may make a wonderful hog---but that remains to be seen, so I'll place the older pig first because it's larger, better developed, has more spread and type, and it shows to a better advantage.

According to Mr. Russell a spring-farrowed pig ought to weigh around 200 pounds at the fall show time.

Show pigs ought to be in a good, growing condition but not too fat. Judges are beginning to discriminate against hogs that are too fat in the show ring. This condition tends to injure the hog for breeding purposes and also for best results in the fattening pen. Keep pigs growing from the day they are farrowed until they reach maturity or until they are marketed, but don't force them too much. The object is to cause steady development rather than excessive growth.

Now folks, I've said a lot about selecting brood sows, taking care of bred sows, and then taking care of the pigs after farrowing. I've also talked about having show pigs farrowed on or soon after March first, and about pampering and overfeeding show pigs. I've done this because Mr. Russell believes these things are important in the selection of both exhibition and breeding hogs.

Now, the question before the house is---WHEN are we actually going to select these pigs? Can it be done when the pigs are 3 weeks old, 5 weeks old, or would it be better to wait until weaning, or say, 2 weeks after weaning?

Well, Mr. Russell says select the brood sow, breed her, and take good care of her until she farrows. Then he continues---take good care of her during farrowing and on through until after the pigs are weaned. Give all the pigs about the same kind of good treatment during the suckling period and see that every pig has a chance to show what it can do.

About 10 days or two weeks after the usual weaning time make the first selection of the show and breeding pigs.

Of course, it's wise to make other selections as the pigs continue to grow and develop, but the first real selection can best be made two or three weeks after weaning time. There are of course, exceptions to this rule, but that's the general practice.

In about a month I'm planning to give you some more information on this same subject, and at that time I hope to be able to tell you about a publication that will contain some valuable information on selecting and fitting hogs for the show ring.

In the meantime, if you have special hog questions or problems take them up with your county agent, your State college of agriculture, or if you prefer, with the United States Department of Agriculture in Washington, D. C.

--ooOoo--

CLOSING ANNOUNCEMENT: Ladies and gentlemen, you have been listening to Your Washington Farm Reporter in one of the regular livestock programs broadcast from Station _____ in cooperation with the United States Department of Agriculture. Your Reporter will be on the air again tomorrow at this same time with some more timely information from the scientists in Uncle Sam's Department of Agriculture.

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1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x f(t) dt$$

It is shown that the function $f(x)$ is continuous and differentiable on the interval $[0, 1]$. The derivative of the function is equal to $f(x)$ itself. This means that the function satisfies the differential equation $f'(x) = f(x)$. The solution of this equation is $f(x) = Ce^{x-1}$, where C is a constant. By using the initial condition $f(0) = 0$, we find that $C = 1$. Therefore, the function $f(x)$ is equal to $f(x) = e^{x-1}$ on the interval $[0, 1]$.

2. The second part of the paper is devoted to the study of the properties of the function $g(x)$ defined by the equation

$$g(x) = \int_0^x g(t) dt$$

It is shown that the function $g(x)$ is continuous and differentiable on the interval $[0, 1]$. The derivative of the function is equal to $g(x)$ itself. This means that the function satisfies the differential equation $g'(x) = g(x)$. The solution of this equation is $g(x) = Ce^{x-1}$, where C is a constant. By using the initial condition $g(0) = 0$, we find that $C = 1$. Therefore, the function $g(x)$ is equal to $g(x) = e^{x-1}$ on the interval $[0, 1]$.

3. The third part of the paper is devoted to the study of the properties of the function $h(x)$ defined by the equation

$$h(x) = \int_0^x h(t) dt$$

It is shown that the function $h(x)$ is continuous and differentiable on the interval $[0, 1]$. The derivative of the function is equal to $h(x)$ itself. This means that the function satisfies the differential equation $h'(x) = h(x)$. The solution of this equation is $h(x) = Ce^{x-1}$, where C is a constant. By using the initial condition $h(0) = 0$, we find that $C = 1$. Therefore, the function $h(x)$ is equal to $h(x) = e^{x-1}$ on the interval $[0, 1]$.

YOUR FARM REPORTER AT WASHINGTON

Tuesday, March 10, 1931.

★ MAR 16 1931

Crops and Soils Interview No. 10:

The Man and the Farm.

ANNOUNCEMENT: You can separate a man from a farm. But as long as he is farming a farm, the man himself has a lot to do with how well the farm pays. Specialists of the United States Department of Agriculture have been looking into some of the human relationships behind successful farming, and now your farm reporter at Washington reports to us what they have found. -----

Yes, we are going to talk about the human side of farming today.

Some farmers just naturally seem to get more for their work than others. I guess we've all been up against it to explain why some fellows do well, and others on land that seems just as good or better, fail to get ahead. We sometimes feel that many succeed because they have peculiar financial or family advantages in their favor. But is that generally true?

It is pretty hard to get at the personal and family influences behind the figures that show up on farm account books. But during the past year, the United States Department of Agriculture and the University of Minnesota have made a good start toward getting at some of the human elements in farm success.

And I will say right here that some of their findings, last summer, as sketched for me by Mr. W. W. Wilcox, who had charge of the field work in this investigation, are not just according to the way some of us have been thinking.

For instance, I dare say most of us have the idea that the farmer who has a grown son working at home with him generally has the advantage over the farmer who has only hired help. This was not true on the Minnesota farms studied. Mr. Wilcox compered the earnings of the farmers having grown sons at home with those of farmers who had no grown sons, and found that, in general, the farmers with family help didn't make as much as the ones who had no children working on the home place.

Of course, Mr. Wilcox says, there are a number of individual cases where an interested grown son at home or a considerable amount of available family labor has a lot to do with the success of the business. But taken by and large, it seemed that the farmers with family help didn't do so well. They have to be more alert than other operators in order to use the help they have efficiently.

Then there is this question of a better start -- or what we sometimes think of as a better start; that is, the farmers who inherited some property, as against those who had no inheritance.

Mr. Wilcox found when he compared the earnings and size of farm of those who got some property by inheritance and those who got none that way, that those who inherited had bigger farms but they did not have as high average labor earnings as the group who had been entirely dependent on their own efforts.

Furthermore, the earnings of the farmers under forty who farmed the same farm their fathers did, were not as big as those who had gone on to other farms.

Those are just a few of the things brought out in this investigation. And, by the way, this particular group of farmers included in this survey were 172 farmers in southern Minnesota who have been cooperating with the Department and the Minnesota Agricultural Experiment Station. Mr. Wilcox visited these men and interviewed all of them ^{on} two different occasions. He got a complete record in each case.

Ninety of the men claimed they had been handicapped during the past five years because of lack of capital, but Mr. Wilcox concludes from the data collected that being financially embarrassed is more a result than a cause of small earnings on the farm.

Among the things which pay big dividends on a farm he lists knowledge of technical agriculture, and a liking for your work. He asked these farmers fifty technical agricultural questions on farm subjects covered by extension workers, farm papers, and farmers' bulletins, and found that the men making the best scores were the men who were most interested in the farm business, and who had studied farm problems and those who were alert to what was going on about them. They were also the men making the best incomes.

Now, just to show you how a farmer's likes and dislikes affect his earnings, let us give you Mr. Wilcox's findings. He asked these farmers if there was any part of the farming they were doing that they didn't like. Poultry seemed to reflect the greatest dislike or lack of interest. Being a side-line it often gets less consideration than other livestock. Mr. Wilcox found a difference of over 100 per cent in the net returns per hen of farmers when he checked up the returns of those who disliked poultry with the returns of those who did not object to poultry.

He also found that farmers who do not like to work with or repair machinery apparently are also farming under a handicap. Although they didn't have as much money invested in machinery, their total power and machinery cost per crop acre was above the average of the men who had no dislike for mechanical work.

In fact, Mr. Wilcox says that men disliking a certain enterprise, whether it be chickens, dairy cattle, hogs, or machinery, have a definite

handicap to overcome if they are to be successful in it. Their dislikes generally show up in the cold figures of the net returns from that part of their business.

It seems from this study, too, that a lot of us "know better" than we "do". In interviewing these Minnesota farmers, Mr. Wilcox found that a very much larger percentage of them know the things which are desirable, a very much larger number of them than those who actually follow what they know. A surprising number of farmers indicated that although they knew some recommended practice was good they had not decided to do it, or they "just never got to it."

Those men who had the ambition to succeed or the initiative to accomplish those things they know are desirable are the ones who, the records showed, are the most successful.

The one major conclusion which can be drawn from this study so far, Mr. Wilcox points out, is that the farmer himself by the use of his judgment, and the exercise of his will, and the control he exercises over the farming business, in most cases, is responsible for the degree of success he enjoys.

ANNOUNCEMENT: Your farm reporter at Washington has just given you a report on a survey of the relationship of certain personal and family influences on farmers' earnings. This report comes to you through the cooperation of Station ____ and the United States Department of Agriculture.

YOUR FARM REPORTER AT WASHINGTON.

Wednesday, March 11, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

All Regions U. S. Department of Agriculture

CONTROLLING CHICK DISEASES DURING INCUBATION.

OPENING ANNOUNCEMENT: This is Wednesday and according to our Farm Reporter schedule the day when Your Washington Farm Reporter gives his regular POULTRY talk. His subject today---CONTROLLING CHICK DISEASES DURING INCUBATION is very timely, therefore, we'll start the program. All right, Mr. Reporter.

---ooOoo---

Last week I talked to you people about producing good, hatchable eggs, and wound up with the statement that the production of such eggs was not worth a great deal unless they were carefully and properly incubated.

Mr. A. R. Lee, our poultry specialist in the United States Bureau of Animal Industry tells me that more than one and one-quarter billion chicks are hatched in this country every year. Imagine what a sight that would present if they could all be hatched at one time and placed in a big yard together. Mr. Lee further states that more than three-fourths of a billion of these chicks are hatched by artificial incubation. In other words, the old "settin'" hen is still responsible now for about 40 per cent of all the chicks hatched. However, 40 per cent of one and one-quarter BILLION is no small figure itself, and the old hen, therefore, is still responsible for the incubation of many of her own eggs, and the brooding of many of her own chicks.

The hatching of more than three-fourths of a BILLION chicks by artificial incubation has led to the establishment of big hatcheries in which large cabinet incubators are gradually but surely replacing the smaller machines formerly used.

The bringing together of thousands of eggs and the hatching of thousands of chickens at practically one time, and often at the same place, have made the problem of controlling disease in incubators of very great importance.

During the World's Poultry Congress held in London last summer, Dr. Hubert Bunyea of the Pathological Division of the United States Bureau of

Animal Industry presented an interesting paper on controlling PULLORUM disease----commonly spoken of as B.W.D.

Now pullorum infection of hens is a disease which requires special attention during the incubation period.

Experiments conducted by the United States Department of Agriculture and also by State agricultural experiment stations show that B.W.D. is often spread during the hatching period in the incubator.

After reporting the results of several experiments Dr. Bunyea says, "It is evident ----**** -- that pullorum-disease infection may be transmitted from diseased to healthy chicks in various types of incubators by exposure for from 18 to 24 hours from the time of hatching WITHOUT actual CONTACT between the chicks."

It was thought for a while that the spread of B.W.D. in incubators at the time of hatching was confined mostly to incubators with a forced draft, but experiments have not proved this to be true. On the other hand, it now appears that the spread of B.W.D. during the incubation period is NOT confined to cabinet incubators with a forced draft, but that it occurs also in still-air machines as well.

This serves to emphasize the importance of thoroughly cleaning and disinfecting all incubators before filling them with eggs regardless of what kind or type ~~the~~ machine happens to be.

Formaldehyde gas has proved to be one of the best incubator disinfectants available up to this time. It is made from a combination of formalin and permanganate of potash, BUT LISTEN-----DON'T YOU TRY TO DISINFECT AN INCUBATOR WITH FORMALDEHYDE GAS from what you have heard me say in this talk. NO----SIREE----DON'T DO IT. Formaldehyde gas is dangerous---and powerful---you know it is, or it wouldn't kill so many troublesome germs in an incubator, but it must be used according to instructions or it may get YOU instead of a germ in the incubator. I'll tell you where to get detailed information on this gas treatment at the end of the talk, but don't try to make it yourself. I'm simply reporting these experiments to you because they are good and because they point to something better, but again let me caution you to watch your step around formaldehyde gas.

Cleanliness is as essential in the hatchery as it is in the incubator. And since B.W.D. is a disease passed from a pullorum-diseased hen to many of her eggs, and since these eggs often hatch out B.W.D. chicks---it becomes necessary to disinfect the incubator during the hatching period.

I just told you a moment ago that Dr. Bunyea found in his experiments that B.W.D. can be transmitted from diseased to healthy chicks in the same incubator from 18 to 24 hours after hatching WITHOUT ACTUAL CONTACT BETWEEN THE CHICKS. In that case a disinfectant able to kill B.W.D. germs in an incubator and mild enough to let the chicks thrive and live uninjured, would help in controlling this costly and troublesome chick disease we call B.W.D.

It has been found that the formaldehyde gas treatment, when properly managed, can be used in incubators while the chicks are being hatched without injuring them, and can be used in sufficient quantities and strength to control this troublesome chick disease to a certain extent.

Right here I want to say that Mr. Lee cautioned that disinfecting incubators containing baby chicks is a far more particular job than disinfecting empty incubators before they are filled with eggs. It would be well, and decidedly advisable to experiment with an empty incubator before trying the demonstration in one filled with baby chicks emerging from the shells.

According to Dr. Bunyea's report, a high humidity at hatching time is necessary for best results with this particular disinfectant. High humidity tends to check the spread of dust and chick down, during the hatch. A wet-bulb reading of 90 per cent gave much better results than one of 75 or even 80.

As a general rule, there are 3 formaldehyde gas treatments given an incubator during the hatching period.

The first treatment is given when about 10 per cent of the chicks are out of the shells---in a normal hatch.

The second treatment is given 12 hours after the first treatment.

The third and last treatment is given 12 hours after the second treatment, or 24 hours after the first treatment.

All dry chicks are removed from the incubator after the second treatment, and there are three treatments, all given within a period of 24 hours.

I was informed by Mr. Lee that this formaldehyde gas treatment for baby chicks at hatching time is especially adapted for use in INCUBATORS HAVING FORCED-DRAFT VENTILATION. The experiment however, is valuable, for as Mr. Lee points out it shows the possibility of at least partly controlling B.W.D. in certain types of incubators. This information is also of interest to you producers in another way. If you buy baby chicks and have an opportunity to get them from a hatchery using this treatment---it may be well to give consideration to such a program---provided of course, the price is in proportion to the value of the chicks received.

I've told you people about these experiments because they are new, and because they point the way to something better, but it must be remembered that B.W.D. is a disease which ought to be wiped out of the breeding flock by the application of the agglutination test rather than controlled in the incubators at hatching time.

Pullorum disease runs a regular cycle from infected hens to infected eggs and from infected eggs to infected chicks that spread it to healthy chicks.

I told you at the beginning of this program that I would tell you where to get information on pullorum disease, B.W.D., and treating incubators with formaldehyde gas, and now I'll make good my promise.

First, write to your own State college of agriculture, and if they do not have the information write either to the United States Department of Agriculture, Washington, D. C., or to your incubator manufacturer. Farmers' Bulletin No. 1652-F, on DISEASES AND PARASITES OF POULTRY contains quite a bit of information on B.W.D.

CLOSING ANNOUNCEMENT: And so we close another Washington Farm Reporter program broadcast from Station _____ in cooperation with the United States Department of Agriculture. Write Station _____ in _____ if you want a copy of Farmers' Bulletin No. 1652-F, on DISEASES AND PARASITES OF POULTRY.

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YOUR FARM REPORTER AT WASHINGTON

RELEASE Thursday, March 12, 1931.

Federal Farm Board Interview No. 11:

Recent Developments in
Dairy Cooperatives.

ANNOUNCEMENT: Your farm reporter at Washington today gives us the last of his series of interviews with specialists of the Federal Farm Board on recent developments in farmers cooperative marketing associations. Station _____ has been presenting these reports as part of its regular cooperation with the United States Department of Agriculture. Today the report has to do with dairy associations-----Well, Mr. Reporter?-----

---oOo---

These seem to be busy days for milk associations, and for dairy farmers who are getting together to form milk associations. Mr. D. D. Brubaker, of the dairy section of the Federal Farm Board, has been telling me how dairy co-ops are springing up here, there, and yonder.

Mr. Brubaker has been going about over the country for the Farm Board. He is just back from the Pacific Coast, where the dairy farmers appear to be particularly up and stirring. Then, too, there appears to be plenty of activity in our Plains states, and in the Middle West. In fact, I gather from what he says that there is considerable development from one end of the country to the other.

As you know, local associations are beginning to line up in regional organizations. And Mr. Brubaker sees in the regionals the preparation which may lead to the formation of a national dairy association to better control the marketing of surplus milk and milk-products between regions.

You already know about those three big regionals on the Pacific Coast; the Challenge Cream and Butter Association, and the United Dairymen of Washington, and the Interstate Associated Creameries of Oregon.

They have entered into contracts with each other and with the Land O'Lakes, the big regional association of the Middle West, by which each acts as the others agent in its own territory.

However, it was the local associations which he was telling me about in particular. That is, the new associations which may join up into regionals already existing, or provide the individual units for other big regionals in territories where there are none now.

Several associations are in process of forming, and a number of old associations are reorganizing to comply with the provisions of the Capper-Volstead Act and the Agricultural Marketing Act, so they will be truly farmer-owned and

farmer-controlled and can take advantage of the assistance provided by the Federal Farm Board.

In fact, Mr. Brubaker says, on the Pacific Coast around almost every town of any size there is organization work on among milk producers to get together to take care of the surplus milk.

Incidentally, he pointed out, that in southern California, dairy farming is done on a relatively large-scale and under the strictest sanitary requirements. In most cases, producers are required to make two deliveries a day. The milk must be cooled to a certain degree before it leaves the farm. And it must reach its destination cold. That means that producers in that region have to have very extensive equipment to meet those sanitary requirements. If they don't buy ice, they must have some sort of artificial refrigeration machinery on the farms.

In some places, milk which contains more than 25,000 bacteria to the cubic centimeter before it is pasteurized, cannot be sold.

All that, means that dairymen in the southern California region must be in the milk business. There is little chance for the side-line dairyman. Men with forty cows are considered small producers.

Mr. Brubaker also observed in his trips through the country that there is a decided tendency for production to increase in Nebraska, Oklahoma, Kansas, and Colorado. In the grain producing areas, farmers are coming to see that it is time they begin to diversify their farming, and dairying is one of the things they are turning to.

In the South, too, Mr. Brubaker reports efforts are being made to put dairying on a sounder footing, by getting rid of the boarder cows, and by improvements in the feeding and in the handling of the milk on the farm and on the way to market.

From what he says, there seems to be considerable tendency toward bigger milk production and also quite a movement for the formation of dairy associations

He attributes much of the decline in the milk prices, however, to producers outside of cooperatives trying to get the markets away from the organized associations.

He also finds there is a feeling among dairy farmers that the spread of prices between what the dealer pays the producer and what he gets for the milk when he sells it has increased in more cases than it has decreased, and that the dealers are still maintaining their profits even in these distressing times.

These things Mr. Brubaker claims are largely responsible for the applications for help which are coming to the Federal Farm Board from all parts of the country.

However, he says, it is not so much the financial help as the expert assistance in forming their organizations and operating them on the soundest

business basis that appears to be actuating the applicants. For the most part, the dairy farmers have shown a willingness to finance their own cooperatives to the full extent of their ability. They have shown ability to raise a considerable part of the capital needed in launching their associations.

On the other hand, very few of the new organizations are figuring on doing other than dealing in milk at wholesale. The producers don't care to retail milk or to take the retail distributing business away from the established dealers. They simply want to regulate the flow of their product to market, so that the producers don't compete and are not played off one against the other to the added profit of the dealers.

In fact, Mr. Brubaker says that in some cases where the producers have gone into the distribution of milk at retail, they have expressed their willingness to go out of the distribution business in order to get recognition as a bargaining or sales association.

He notes a tendency for producers and dealers to get together and discuss their mutual problems for the more orderly marketing of milk and milk by-products.

ANNOUNCEMENT: Your farm reporter at Washington has just reported to you something of the recent developments in cooperative marketing of milk, as sketched for him by Mr. D. D. Brubaker, of the dairy section of the Federal Farm Board. This report concludes the series on cooperation which this Station _____ and the United States Department of Agriculture have been presenting.

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The first part of the paper discusses the importance of the study and the objectives of the research. It also mentions the scope of the study and the limitations of the study.

The second part of the paper discusses the methodology used in the study. It mentions the data sources and the data collection methods. It also mentions the data analysis methods used in the study.

The third part of the paper discusses the results of the study. It mentions the findings of the study and the conclusions drawn from the study. It also mentions the implications of the study and the recommendations for future research.

The fourth part of the paper discusses the conclusion of the study. It mentions the overall findings of the study and the overall conclusions drawn from the study. It also mentions the overall implications of the study and the overall recommendations for future research.

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MAR 16 1931

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YOUR FARM REPORTER AT WASHINGTON.

Monday, March 16, 1931

(NOT FOR PUBLICATION)

SPEAKING TIME: 10 Minutes.

A SPRING LIVESTOCK CLEAN-UP CAMPAIGN.

ANNOUNCEMENT: And now Station _____ takes pleasure in presenting Your Washington Farm Reporter in one of his regular LIVESTOCK programs. Your reporter is going to use the next ten minutes in talking about a SPRING LIVESTOCK CLEAN-UP CAMPAIGN. All right, Mr. Reporter.

Folks, I want to talk to you today about cleaning up livestock premises. I want to talk about that important subject now before the rush of spring work pushes it aside for plowing and planting.

Not long ago I visited in a farm home somewhere within the borders of the United States. It was not a pretentious home, the furnishings were plain and simple yet perfectly adequate for the needs and comfort of the family.

There was one thing in particular about the house in which I visited that impressed me very forcibly. IT WAS CLEAN. And when I say clean, I don't mean maybe, halfway, or something else -- I mean CLEAN. However, when I went from the house to the barn for the purpose of looking over the farmer's livestock -- I found a different situation. The horse lot which was large, roomy, well-drained, and otherwise well-suited for the production of livestock, contained entirely too much hardware and too much building material scattered about over the lot. Of course, it would be wrong for me to say the lot was full of broken horse shoes, rusty nails, baling wire and pieces of decaying boards. It wasn't full of these materials, but it did, in my opinion, contain enough of these objectionable livestock troublemakers to present a rather hazardous situation.

I'm told by authorities in the United States Department of Agriculture that such things as rusty nails, baling wire, broken glass, and even broken horseshoes, have been known to cause livestock producers a lot of trouble and expense.

Mr. D. S. Burch, trusty assistant to Dr. John R. Mohler, chief of the United States Bureau of Animal Industry, told me the other day that cleanliness played an important part in the production of livestock.

He called my attention to the fact that it would be a good thing for stock raisers to designate and set aside one day in the early spring for a general clean-up of livestock premises. Stables, horse lots, pastures and other grounds frequented by livestock should be gone over on this day. Such things as baling wire, old boards, rusty nails, broken glass, and even sharp rocks should be removed from enclosures where animals are permitted.

Here's a story of one livestock producer who makes every day a clean-up day. He does it in this manner. Out in the corner of his horse lot he places an empty barrel. Whenever he finds a piece of wire, an old nail, or any piece of hardware or glass that may cause injury to an animal he picks it up, puts it in the barrel, and when the barrel is full he hauls it to the dumping ground. In this way this particular farmer keeps his place clear of these objectionable livestock troublemakers.

Cleaning up livestock premises is to some extent a habit. If a person gets in the habit of picking up these objects most likely to cause livestock injury and placing them out of the general passageway -- that person is safeguarding his animals from injury and keeping money in his pocket that would otherwise go to replace injured or maimed livestock.

I could tell you stories of fine horses being cut by loose barbed wire in a pasture, of a mule that cut her back badly by rolling on a piece of broken horsehoe, of a fine milk cow that ruined her udder on an old empty, jagged flour barrel. But the majority of you listeners already know stories similar to these. Unfortunately, some of you have already had the experience, and others of you are apt to have it unless you keep the livestock premises clear of these trouble starters.

It isn't often that I ask you listeners to do something while you are in the middle of a program, but I'm going to change the order at this time and make ONE REQUEST. Get a calendar if there is one in reach. It may not be convenient for you to clean up the livestock premises to-day or even to-morrow, but if you'll glance over the calendar at the end of this program and then draw a big circle around the day set aside for the clean-up campaign -- that will help to bring the matter to your attention again, and a reminder is all that is necessary in most cases. A large majority of you livestock producers understand the value of these clean-up campaigns, and many of you make a practice of keeping your places cleaned up, and you're to be commended for such work. This broadcast at this particular time is simply to remind you that spring is approaching, and that it won't be long until old animals that have been housed all winter will be turned out in the lots and in the pastures.

When this happens these animals that have been shut in most of the winter are going to play, run, kick up their heels, and gallop about over the lots and pastures. You know how they act. And in this moment of exhilaration they are apt to overlook a board with an old nail sticking up through it, a loose piece of barbed wire, an old box, or a jagged log over in a corner of the premises. I've seen animals go places on these spring canters that they

never see during the remainder of the year, and that's why the territory they use for their spring playground should be clear of these objects I've been talking about.

In addition to the older animals that use the spring season for limbering up, we have the thousands of young colts, young calves, young pigs, young puppies and so on coming out into the open lots and fields for their first time. What a pity it is to see a beautiful calf, or a frolicking colt limping around with a very sore foot because some one left an old board with a nail in it lying out in the horse lot.

Young animals are not trained in the ways of the world when they walk into the horse lot for the first time on a beautiful spring morning, and like children, they learn in many instances through the trial-and-error method. That's all right provided the error is not so great as to cause serious injury or perhaps loss. Let me give you an example. I have a friend here in Washington who came from the Bluegrass region down in old Kentucky. He has a little boy about 5 years old and being a good father he got the boy a young Collie pup. The other day the pup went to sleep on the edge of a high step, and during his dreams rolled off and down onto a concrete floor quite a distance below. It was first thought his leg was broken, but later investigations revealed only a bad sprain. Of course, that pup will likely remember that it hurts to get a fall, but many young animals will not be that fortunate at the end of their first error -- therefore, remove any dangerous obstacles from places frequented by livestock. Don't depend on them to take care of themselves. They can do that in most cases, but why take a chance on losing an animal or having one injured by some object that can be removed from their pasture or feed lot in a few moments?

I've been talking to you to-day about cleaning up livestock premises this spring. Next Monday I'm going to talk to you about cleaning up parasites both on and in general farm animals.

There is no publication telling how to pick up rusty nails, old boards, sharp rocks, and so on. You'll just have to work out that for yourself.

However, I do want to remind you that the calendar you are perhaps holding in your hand, is there for a purpose. MARK THAT SPRING CLEAN-UP DAY NOW, AND MARK IT WITH A BIG CIRCLE SO YOU WON'T FORGET IT.

Don't take chances with livestock. It's better to be safe than sorry, and a stitch in time saves nine in many instances.

CLOSING ANNOUNCEMENT: Ladies and gentlemen, you have been listening to Your Farm Reporter at Washington broadcast a livestock program from Station _____ in cooperation with the United States Department of Agriculture. Don't forget to mark your calendar. Draw a big circle around the spring clean-up day.

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YOUR FARM REPORTER AT WASHINGTON

Wednesday, March 18, 1931.

NOT FOR PUBLICATION

SPEAKING TIME: 10 Minutes.

ALL REGIONS.

BROODING CHICKENS

ANNOUNCEMENT: Every Wednesday Your Washington Farm Reporter broadcasts a POULTRY program from Station _____ in cooperation with the United States Department of Agriculture. The subject for this occasion is BROODING CHICKENS. All right, Mr. Reporter.

On a recent holiday I visited the poultry department of the United States Animal Husbandry Experiment Farm at Beltsville, Maryland. I found our poultry friends, Mr. A. R. Lee and Joe Quinn, with their sleeves rolled up working away filling incubators with nice, fresh hen eggs. ~~This~~ work had to be done on Monday of each week.

They may have been slightly peeved for having to work on a holiday, but they're both good natured and seem to be thoroughly wrapped up in their work so it wasn't long until I had the spirit myself, and was actually helping fill incubators.

After the rush was over and we had a little breathing spell, I got to talking to Mr. Lee about brooding chickens, and we had quite an interesting set-to up on top of some empty egg cases.

I don't need to tell you people that the old hen is still responsible for the brooding of millions of chicks in this country every year. However, as Mr. Lee points out, artificial brooding is becoming more and more popular on farms as well as in commercial plants.

Brooding, by the way, is one of the hardest phases of the poultry industry and the place where greatest losses are apt to occur.

the According to Mr. Lee, it's necessary to replace from 45 to 60 per cent of/laying flock every year with pullets if poultrymen expect to make the most from their vocation. Under normal conditions it will take 1,000 baby chicks in the spring to turn out say 400 pullets in the fall. You can see, therefore, that brooding chickens for replacement alone is an enormous task in this country, to say nothing about the broilers, fryers, and roasters we use for eating.

Excepting the old hen, the most common method of brooding chickens now is perhaps the colony brooder house. This was originally a commercial method, but it has proved so successful that nearly every farmer who gives careful attention to poultry now has a colony brooder house and many farms have more than one house.

One advantage of a colony brooder house is that it permits the entire season's chick supply to be brooded at one time. This, of course, saves labor, time, and quite a bit of trouble. It also enables the farmer to have a uniform flock from the standpoint of size and age, and permits the brooding of a large number of early hatched chicks.

Of course, commercial poultrymen find colony brooder houses very satisfactory in brooding their flocks.

I asked Mr. Lee what kind of heat is generally used in these colony brooders, and he replied that coal stoves are generally used.

However, there is a growing use of electricity in brooding chickens, and a considerable use of oil, especially in the milder sections of the country. Coal brooders are especially satisfactory in the colder sections while electric brooders require the least labor and attention, and seem to give best results where the temperature during the brooding period does not go below freezing.

Mr. Lee said that the long hot-water-pipe brooders were coming back into use again in some sections. The trouble with this kind of brooder house was that the soil around them soon became full of disease germs and the chicks developed leg weakness and other ailments. However, we can use these brooders now because we know how to control leg weakness and how to raise chicks in confinement and still keep them free from disease. For instance, instead of the small, outside dirt yard we can now have concrete or wire-floored yards which can be kept sanitary.

The colony brooder was developed during the time when we were having trouble with the hot-water-pipe brooder. It proved so satisfactory that it has been retained and is now one of the most popular methods of brooding.

Along with the colony-brooder development came other new things in brooding chicks. For instance, thousands of chicks are now brooded for a few weeks on wire-screen floors before they are allowed to set foot on soil. This is to prevent chicks from picking up various infections from droppings and from contaminated soil.

It has also been found possible to raise chicks without sunlight, although sunlight is still highly recommended. Cod-liver oil, which is a good sunlight substitute, can be used with satisfactory results where chicks are brooded in confinement without sunlight.

Many problems of chick management become greatly intensified when chicks are raised in close confinement. Crowding, toe picking, and feather picking are just a few of the worst. Every condition must be just right to raise chicks in close confinement, and that's why wire-screen floors, cod-liver oil, and other precautionary measures are recommended where chicks are brooded and raised in close confinement.

The outdoor raising or brooding of chicks does not present such a hard problem provided the soil is clean, and the general surroundings are kept in a sanitary condition. Chicks outdoors on a clean soil are able to take care of minor deficiencies in rations or management while, as I said a moment ago, confined chicks must be handled just right.

Battery brooders were introduced a few years ago and have become quite widely distributed on poultry farms. Battery brooding is an intensive method of brooding great numbers of chicks in a very small space.

Mr. Lee told me that battery brooding was especially adapted to the holding of chicks for short periods of, say, a few weeks at a time, and also for the production of winter broilers. Battery brooders are used to best advantage in connection with other methods of brooding. The chicks can be kept for three weeks on the wire-floored battery brooder and then transferred to colony brooder houses or other types of brooders. Mr. Lee spoke of one poultryman who is getting good results by keeping chicks in a battery brooder for three weeks and then transferring them to a colony brooder and keeping them there until they are ready to be housed in a cheap shelter.

Chicks have a tendency to crowd into dark corners at night. This, can be prevented in at least two different ways.

First, if electricity is available, burn a very dim light in the brooder house during the night. This will enable the chicks to find their way to the brooder instead of crowding in the corners.

Second, teach chicks to roost at an early age by placing low roosts right up next to the brooder.

Mr. Lee gave me a great many other pointers on brooding chicks, but my time will not permit a further discussion of that subject at this time.

The majority of you poultry raisers know the importance of such things as temperature, ventilation, sanitation, humidity, and so on in the brooding of chicks. If your mind is a little rusty on some of these points of brooding or if you desire new information on the brooding problem in general ask for a copy of Farmers' Bulletin No. 1538-F, on INCUBATION AND BROODING OF CHICKS. This bulletin takes up the incubation and brooding of chicks from nearly every angle and for all parts of the country. It contains information for hatching

and brooding chicks with the old pecking hen, and for the commercial hatcheryman with mammoth incubators and large brooders. A postal card will bring this bulletin to your mail box.

CLOSING ANNOUNCEMENT: This closes the Washington Farm Reporter program broadcast from Station_____ in cooperation with the Federal Department of Agriculture. Write this station or the United States Department of Agriculture in Washington, D. C., if you want a copy of Farmers' Bulletin No. 1538-F, on INCUBATION AND BROODING OF CHICKENS.

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UNITED STATES
DEPARTMENT
OF AGRICULTURE

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MAR 16 1931

U. S. Department of Agriculture

YOUR FARM REPORTER AT WASHINGTON

Friday, March 20, 1931.

(NOT FOR PUBLICATION)

SPEAKING TIME: 10 Minutes.

ANNOUNCEMENT: And now, ladies and gentlemen, here is Your Farm Reporter at Washington. He's been talking again with his friend, Dr. J. C. McDowell, veteran dairyman in the Bureau of Dairy Industry of the United States Department of Agriculture. Now, he's going to pass on to you some of Dr. McDowell's remarks about grade and purebred dairy cows. All right, Mr. Reporter.

Dr. McDowell, as you know, is chief of the dairy herd-improvement work of the Bureau of Dairy Industry.

And as such, he supervises the compiling of records made by hundreds of thousands of dairy cows in all parts of the United States.

Well, some time ago, Dr. McDowell's staff compared the records of 74,000 grade cows with the records of 36,000 purebred cows -- 110,000 cows in all. The records were all for the same year, and they came from all sections of the country. Four breeds -- Holsteins, Jerseys, Guernseys, and Ayrshires -- were represented.

Now, here are the results:

On the average, the purebreds won out over the grades, by the following margins: 11 per cent in production of milk; 9 per cent in butterfat; and 15 per cent in income returned over cost of feed.

Therefore, the purebreds seem to be, unquestionably, a jump or two ahead of the grade cows.

However, it may seem surprising to some of you that they were not farther ahead. Well, the big reason why they aren't is simply this, according to Dr. McDowell: The grades were culled very closely, while the purebreds were not.

Then Dr. McDowell told me a story. It is a true story, and it is hardly a complete story as yet -- but here it is, in his own words:

"One day as I was working in my office," he began, "a young man came in to see me -- a very bright, fine-appearing young man, by the way. He introduced himself and announced that he was a Hindoo. He was brought up in India, but had come to this country for an education and was a graduate of the University of California.

"He told me he was very much interested in Dairy Herd-Improvement Association work; and he had been thinking it would be a good idea to introduce the Dairy Herd-Improvement Association into India.

"Well, I started to tell him what I could; but before I had gone very far, I naturally mentioned culling; and along with it, the desirability of sending the low producers to the butcher.

"When I came to this point, he stopped me. He reminded me that in India the cow is sacred; no Hindoo could ever kill a cow. All cows, regardless of their production, must live out their natural lives.

"Well, this problem was a stunner. What would you advise in a case of this sort? I didn't know, but I did happen to think of a story.

"It was a story told by an American missionary who had just returned to Washington, D. C., from India. The missionary told about all animals being sacred: sheep, hogs, even mice and rats, as well as cows. Well, you can imagine what a problem developed when one village was over-run by rats. There seemed to be nothing to do but try to get along with the pests. However, as the rat population kept increasing, the Hindoos became desperate. They finally built high box traps, and they caught rats by the thousands, and tens of thousands.

"But even then, the rats could not be killed. And so, the people had another happy thought. One dark night, the men carried all the boxes over to the borders of another Hindu village, and set the rats loose."

Dr. McDowell paused long enough to smile. "I wondered," he remarked, "if we couldn't solve the cow problem in much the same way. And I did suggest that they might turn their cull cows loose in the mountain districts and let them forage for themselves.

"However, this met with the same objection. The cows would not find enough to eat, and they would die, and the responsibility would rest upon the Hindoos."

"Well, how did you figure it out?" I asked him, as he paused again.

"I had what I think was a lucky inspiration," he replied. "It came to me that the problem in India is almost identical with the problem of purebred livestock breeders in this country. There has been very little culling and killing of purebred cows. To the purebred breeder, the pedigree is almost sacred. Yet, these men have built up their herds to a high point, and they have done it almost entirely through breeding alone.

"Through breeding alone, the purebreds excel the grades by 11 per cent in milk production, 9 per cent in butterfat, and 15 per cent in income returned over cost of feed.

"Now, if we can improve our herds to such a degree by breeding alone, why can't the Hindoo people improve their herds in the same way?

"I put the question to the young man. After some discussion, he said, "It's a go. I believe we can do in India what your breeding purebreds have done in this country. We can't kill the cows that are culled out----but we can hitch them to a plow or let them live on a low-feed ration, and we WON'T BREED THEM."

Now, that is the story. It is not complete, because Dr. McDowell has not yet heard from the young man. He expects, however, to hear most any day that a wideawake Dairy Herd-Improvement Association has been established in India---and that it is functioning successfully, despite the fact that low-producers cannot be sent to the butcher.

The moral to his story, however, is not that breeding alone is sufficient. Herds may be built up simply by breeding, combined with good feeding; but the process can be greatly speeded up if close culling is added.

Such a system is necessary in India; but there is nothing in our religion which forbids sending low-producing cows to the butcher.

"From a further study of the records of these 36,000 purebreds of the four breeds, we found a very interesting fact. We found that we could cull out the lowest-producing 10 per cent of each breed, and send them to the butcher, without disposing of any profitable cows. In fact, culling out the lowest 10 per cent would increase, rather than decrease, profits. It would eliminate many cows which are actually eating their heads off."

ANNOUNCEMENT: Ladies and gentlemen, you have been listening to Your Farm Reporter at Washington. He asks me to remind you of that bulletin called, "Dairy Herd Improvement Associations, and Stories the Records Tell." It is Farmers' Bulletin No. 1604. Write for your copy either to Station_____, or direct to the United States Department of Agriculture in Washington, D. C.

DEPARTMENT

Grass and Soils Interview No: 14

That Lawn

OFFICE OF INFORMATION

ANNOUNCEMENT: And now your farm reporter at Washington sends you another report. As usual, he has visited scientists of the United States Department of Agriculture to get timely tips on topics of interest and value. Today, the subject is that lawn of yours---And here is what they say about it

I have found a good way to fight weeds in the lawn.

U. S. Department of Agriculture

The pasture and fine turf specialists of the United States Department of Agriculture, are the men who told me about it.

Few people seem to realize, these men say, that one of the very best ways to get ahead of the weeds is to fertilize the lawn. Properly fertilized grass "comes back" and runs out the weeds.

Of course, suitable soil and good drainage are very essential to the development of the lawn. But the specialists say that in most parts of the country it takes constant attention to maintain even a fair lawn.

And regardless of the kind of soil, most lawns need an occasional application of some good fertilizer. Thoroughly rotted stable manure is a first-rate fertilizer for grass, if the manure is not coarse. Manure well composted with sod and leaf mold and sifted before using makes a good dressing for the lawn. But never put on coarse manure or humus dressings until after the end of the growing season.

Grass like other plants most often needs the Big Three of plant foods, potash, phosphorus and nitrogen.

The forage crop men advise four or five pounds of muriate of sulphate of potash and ten to fifteen pounds of superphosphate to each 1,000 square feet of lawn once every two or three years.

There are some soils in the country which have plenty of phosphate, and potash; but there are not many. The safest thing to do in fertilizing a lawn is to first take care of the phosphate and potash needs. The addition of those fertilizer materials won't do any harm even if the soil is one of the favored ones which have enough of those foods.

After that, the nitrogen becomes the important thing to look after.

In adding nitrogen, the specialists suggest, it is a good idea to mix some such materials as cottonseed meal, or activated sludge, or castor meal with the sulphate or ammonia or nitrate of soda. The nitrate of soda and sulphate

of ammonia, they explain, are forms of nitrogen which act quickly. They put that dark green color in the grass in a few days. To keep it there, you need something like cottonseed meal or some other fertilizer material which supplies the nitrogen more slowly, and lasts longer, than those purer forms of nitrogen. But there is another reason for mixing the sulphate of ammonia or nitrate of soda with more slowly-acting materials, such as cottonseed meal, and that is to lessen the danger of burning. Used by themselves, the quick-acting fertilizers are often too strong.

After you put the fertilizer on, they say water the lawn thoroughly, so as to wash the fertilizer off the blades of grass and carry it down into the soil.

The fertilizer is applied three times during the growing season.

Speaking of watering, however, these men point out that most of us water the lawn at the wrong time. But they are not at all optimistic about us changing our ways.

Most of us water the lawn after work in the evening, and in many sections the grass stays wet all night and up to nine or ten o'clock the next morning. In that way, the grass is wet more than half the time. That makes conditions right for the spread of some of the important diseases of lawn grasses. In many cases, such diseases have a lot to do with the mangy-looking grass crop in some folks yards.

These turf experts advise watering in the morning for best results. But they admit that most of lawns will probably continue to be watered late in the afternoon and evening when most convenient to the waterer. But from the viewpoint of the good of the grass, the morning watering is much better.

It is better to water less often and more thoroughly than many people do. The forage crop specialists suggest giving the lawn a good long soaking, once or twice a week, instead of a light sprinkling every day. Grass roots normally strike comparatively deep into the soil, and when sprinkled lightly the moisture gets down only a short distance. That causes greater development of the roots near the surface and weakens the lower roots and makes the grass plants more likely to be damaged by adverse conditions at the surface.

Of course, the common lawn grasses are not particularly shade-loving. And to get a good lawn in dense shade under trees and shrubs is no easy job.

However, the specialists say that even the common lawn grasses can be made to thrive reasonably well in light shade if given the proper treatment.

Among the chief items in the proper treatment is thorough watering and liberal use of fertilizers. Water and fertilizers will help to overcome the evil effect of shade to some extent.

And even on a sunny lawn, if the soil really lacks the main plant foods, the grass won't last long without fertilizers being added.

I asked these men how often to mow the lawn. They told me that good turf needs cutting often. But they wouldn't say twice - a week. They say that

is a question of the height of the grass rather than any strict time schedule. Ordinarily, better not let the grass get more than two or two and a half inches high before you cut. And when you cut it, don't cut it shorter than three-quarters of an inch. When you cut it shorter than that, it is too much shock.

And as for rolling, they don't consider that very important. When grass plants are heaved partly out of the ground by frost, the roller sometimes comes in handy for pushing them back into place. But ordinarily, most lawns don't need rolling.

I asked them about chemical sprays for lawn weeds, but they weren't very enthusiastic. In the main, they say, chemicals have not given satisfactory results.

The remedy for the weed problem is to make conditions as favorable for the grasses. One of the best things along that line is the use of fertilizers to stimulate the grasses to crowd out the weeds.

ANNOUNCEMENT: Your farm reporter at Washington has just brought you some hints on the care of the lawn from the Forage Crop division of the United States Department of Agriculture. Station _____ presents this talk in cooperation with the Department of Agriculture.

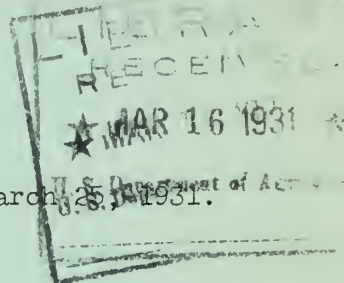
UNITED STATES
DEPARTMENT
OF AGRICULTURE

**Radio
Service**

OFFICE OF
INFORMATION

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YOUR FARM REPORTER AT WASHINGTON.

Wednesday, March 8, 1931.



NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

All Regions

OPENING ANNOUNCEMENT: Every Wednesday morning Your Washington Farm Reporter interviews a poultry specialist in the United States Bureau of Animal Industry and then broadcasts the results of that interview over Station _____ in _____. The subject today is GROWING HEALTHY CHICKS, and now the Reporter reports.

---ooOoo---

Folks, I want to talk to you for a few minutes today about growing healthy chicks. I visited a commercial hatchery over in Maryland the other day and was informed by the hatcheryman that about one-fourth of all the baby chicks hatched in the United States die before they are six months old.

That's a tremendous loss, and remember that it occurs after poultrymen have gone to the trouble of breeding up better birds, producing good eggs, and operating incubators. In other words, it's a loss that occurs after a lot of hard work has already been done.

I thought there must be some good reason for this great baby-chick loss, and I wanted to find out what it is and then tell you people about it, so I went in search of my poultry friend Mr. A. R. Lee in the United States Bureau of Animal Industry.

He says that we are hatching eggs today by the thousands in large commercial hatcheries whereas most of the baby chicks were formerly hatched by the old settin' hen.

Now this concentration of thousands of eggs from different farms and even from different sections of the country, and the hatching of thousands of chicks at one hatchery and often at the same time, have undoubtedly had something to do with the spread of disease. However, we can't blame the hatchery because the hatchery is the modern way of turning out baby chicks. It's just a natural part of our machine age, and the efficient way we have of doing things today.

"What we need to do," said Mr. Lee, "is to learn to grow out these baby chicks without losing so many of them."

"How can it be done?" I asked.

"Well," he said, "a great many poultrymen are practicing a plan they call GROW HEALTHY CHICKS."

"All right," I said, "tell me about it."

"It started in the East," he began, "but has since spread to other sections of the country and is applicable to any section, or any farm."

"There are two main objectives in the 'grow-healthy-chicks' campaign."

"First, to reduce the loss of young chicks, and

"Second, to grow and develop better pullets."

"According to Mr. Lee this 'grow-healthy-chicks' idea is very popular in the sections where it has been tried because it is simple, easy to put into practice and follow, and because definite results can be seen where these practices are followed."

Are you listeners acquainted with the grow-healthy-chicks program? Naturally I can't hear your answers to that question so I'll just play safe by running over----oh,----let me see----I'll take the Missouri plan of growing healthy chicks and tell you about that because this plan is applicable to GENERAL FARM FLOCKS regardless of whether you have 50 or 500 baby chicks.

There are 6 points in the Missouri plan, and here they are:

First, get clean chicks in, say, March or April.

Second, raise these chicks on fresh ground.

Third, use clean brooder houses.

Fourth, feed a GROWING RATION.

Fifth, brood each hatch separately, and

Sixth, separate the cockerels from the pullets as soon as the sexes can be determined.

Every point that I mentioned is simple, yet it's important, and can be put into effect in almost any farm flock.

I should explain that some of the commercial poultry States---have more than 6 steps in their programs, but the grow-healthy-chicks programs all eventually come down to the same principle, which is: "Start with clean chicks, and then keep them clean, give them a CHANCE to be healthy, and they will be."

Take for instance, clean ground. Mr. Lee says that very few people actually realize the value of CLEAN ground in the production of baby chicks. He says there is a tremendous difference in the growth and death rate of chicks raised on clean ground as compared to similar chicks raised on ground where chickens have previously ranged. I might explain here that clean ground means a ground free from disease germs that attack and cause the death of young

chicks. Since most of these germs in their various forms come from chickens in one way or another, it's reasonable to believe that keeping chickens off of certain patches of ground prevents this ground from becoming infested with such germs. If baby chicks are therefore, placed on clean ground where they can have at least an even chance with these germs, they are more apt to thrive and live than if placed on ground previously used by chickens and which may be literally full of germs and parasite eggs.

I was told by Mr. Lee that most of these disease germs that live in the soil carry over from one season to the next, but that they depend on a "crop" of chickens each year to supply them with food and nourishment. His plan is to starve them to death and get rid of them in that manner by not growing chickens of any kind on that soil for at least one full season, and for best results it should be left for two seasons.

I told you a moment ago that there were two main objectives in these grow-healthy-chicks programs. First, to reduce chick losses, and second, to produce better pullets.

Now according to the old adage, the proof of the pudding is in the eating, so let's take an actual case and see if it really pays to follow the principles laid down in the grow-healthy-chicks program.

Missouri has a good program and we've already talked about it so let's see if it pays to follow the grow-healthy-chicks rules in the "show me" State.

Yes, I can assure you that it pays to follow the grow-healthy-chicks rules in producing or raising chickens in Missouri, because I'm looking at their figures and records which tell this story:

Flocks kept under ordinary rearing methods produced an average of 147 eggs a hen per year. Flocks where the grow-healthy-chicks plan was followed produced on an average of 165 eggs a hen per year. That's a difference of 18 eggs a hen per year in favor of the grow-healthy-chicks program. But that's not all. Let's open the pocketbook and look inside for results in dollars and cents. Poultry produced under ordinary rearing conditions produced an income over cost of feed of \$1.86 a hen per year as compared to a production of \$2.65 per hen where the birds were reared under the grow-healthy-chicks program. So, you can see that the grow-healthy-chicks programs not only reduce mortality, but they produce pullets that actually lay more eggs---thereby making more money for their owners.

Mr. Lee reminded me that a little thing---just the feeding of a growing mash in a hopper where the feed could be kept clean often resulted in the rearing of more and better chicks than feeding them out in the open where they had an opportunity to "mess up" their feed.

Disinfecting brooder houses, changing the litter once a week, providing clean drinking water and sanitary conditions throughout the normal growing period, are a few of the simple things that result in more and better chickens from the eggs set or the chicks bought.

I won't have time to go into further details on this subject, but nearly every State has a grow-healthy-chicks program, and you are invited to write your own State agricultural college for information adapted to your section. Farmers' Bulletin No. 1652-F, on DISEASES AND PARASITES OF POULTRY and Farmers' Bulletin No. 1538-F, in INCUBATION AND BROODING OF CHICKENS contain much information on raising more and better chicks. Both bulletins are free for the asking.

--ooOoo--

CLOSING ANNOUNCEMENT: That, ladies and gentlemen, was County Agent Robbins of Fairfield County broadcasting a poultry program from Station _____ in cooperation with the Federal Department of Agriculture. Drop him a card or letter in care of this station if you want copies of Farmers' Bulletin No. 1652-F, on DISEASES AND PARASITES OF POULTRY, and Farmers' Bulletin No. 1538-F, on INCUBATION AND BROODING OF CHICKENS.

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U. S. Department of Agriculture

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YOUR FARM REPORTER AT WASHINGTON.

Friday, March 27, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes

A SPRING LIVESTOCK CLEAN-UP CAMPAIGN

OPENING ANNOUNCEMENT: Ladies and gentlemen, Your Washington Farm Reporter is now ready to broadcast one of his regular FARM REPORTER programs. The subject for today---A SPRING LIVESTOCK CLEAN-UP CAMPAIGN---is especially appropriate at this season, therefore, I'll pull the switch and let the Reporter report.

---ooOoo---

Folks, I want to talk to you for a little while today about cleaning up livestock and getting them all ready for the long journey through the hot, summer months.

I used to ride passenger trains a great deal and I've often watched an engineer climb down from a cab at the end of his run and heard him give orders something like this:

"Tighten up the drive-shaft Joe, clean 'er up all over, fill the boiler with fresh water and have her all ready for the long trip across the desert tomorrow morning."

Now why do locomotive engineers want their engines cleaned up, adjusted, and in perfect condition before they start on long journeys? Well, the answer to that question is rather simple. When a piece of machinery is clean, properly adjusted, and in the pink of condition, it's more than apt to perform in a satisfactory manner.

Many ANIMALS are comparable to locomotives, in that they too need to be cleaned up, adjusted, and kept in the pink of condition. A locomotive with a leaky boiler is comparable to an animal infested with parasites. The locomotive with a leaky boiler may pull into the station on time, and again it may not, so trainmen have long since learned that it pays to keep equipment in good shape. An animal infested with parasites may make a profitable use of the feed it consumes and again it may not, and many livestock producers have learned that it pays to keep animals cleaned up and in a good, healthy condition.

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According to my calendar this is the twenty-seventh day of March and as we often say at this season of the year, "spring is just around the corner."

Millions of young animals are seeing daylight for the first time this spring, and millions of older animals are about ready to start their journey through the summer months.

Some of these young animals and many of these older ones are going to be placed on the market this coming fall and winter. Now the natural question for a livestock producer to ask himself is, "How much will my animals bring when they are marketed this fall?", and I'm informed by livestock specialists in the United States Bureau of Animal Industry that the answer to that question depends largely on what kind of care and treatment the animals receive from the time they are born until they are weighed and paid for at the market.

A sick animal, or one heavily infested with parasites will not produce the best results in the harness nor in the feed lot. Therefore, the thing to do is to get the work stock cleaned up and ready for work before they are called on to go up against the collar from sun-up to sun-down. That same thing is true of livestock being prepared for market. They need to be kept in the pink of condition in order to make the most economical use of their feed.

I'm going to mention a few livestock troubles that ought to be wiped out before the summer months arrive, and then at the end of this talk I'm going to offer you two Department of Agriculture publications that contain much practical information relative to cleaning livestock of both internal and external parasites.

Mr. D. S. Burch, assistant to Dr. John R. Mohler, Chief of the Bureau of Animal Industry called my attention to these publications when I was up in his office the other day.

If you are a hog raiser, try to raise young pigs this spring that will be free from roundworms. Do this by following the swine sanitation or the modified swine sanitation system. This will enable you to avoid large losses not only from such parasites as roundworms, but from other kindred conditions associated with dirty hog lots-----bullnose, for example.

The swine sanitation system will not prevent pig losses from bad breeding, bad feeding, bad management, bad judgment, chilling, accidents, and similar causes. You will have to prevent these by appropriate measures.

Thousands and thousands of pigs are farrowed in this country every spring, and roundworms check or completely stop many of these before they reach the market or the smoke house. The majority of you listeners still have time to prevent roundworm losses this spring and summer. For further information ask your county agent, or your State college of agriculture.

Straw stacks are good breeding places for stable flies and stable flies often annoy and pester livestock until the animals are not up to par either in the harness or in the pasture. March and April are good months to destroy scattered straw stacks. The straw can either be plowed under or burned.

Flies also breed in manure piles. If the manure piles are scattered on the fields in the early spring that solves that part of the fly problem.

Many livestock producers in the cattle tick area begin dipping animals in the early spring and keep it up at intervals of 14 days until about November. Cattle ticks are unable to live under such a rigid dipping system.

This is the season when poultry raisers in the blue bug or fowl tick regions spray henhouses, and especially nests, with anthracene oil.

April is the baby-chick month. Remember to keep chicks away from turkeys, and away from areas occupied by turkeys. Chicks are highly susceptible to gapeworm infection, and the disease is often acquired from turkeys.

Many old settin' hens are on the nests this spring. Examine these hens and if they are lousy---treat them before the chicks hatch.

If it's possible to do so, put all young livestock---lambs, calves, colts, and so on---on clean, safe, well-drained pastures and away from older animals other than their mothers, and also away from areas occupied by older animals during the past year or which have not been sown to a fresh crop since so occupied. Older animals often harbor worms, and young animals are highly susceptible to worm infestations and to the resulting bad effects. Therefore, keep young stock on clean pastures, and away from older animals and minimize losses from this source.

Now I want to say a few words about cleaning up "Old Dobbin" the plow horse. There are a number of internal and external parasites that pester horses and mules. Some of these are serious enough to interfere with actual work and some are just annoying.

I won't have time to mention other livestock trouble makers, so reach for your pencil and I'll mention the bulletins I spoke of a moment ago. With these in your possession, you'll be able to clean up your livestock and open the spring season with animals ready to go---either at the plow, in the feed lot or pasture.

PARASITES AND PARASITIC DISEASES OF HORSES is the title of Circular No. 148-C, and A CALENDAR OF LIVESTOCK PARASITES is the title of Miscellaneous Publication No. 25-MP.

These publications refer to still other Department of Agriculture publications on specific troubles and treatments. Therefore, you are getting valuable livestock information in the two publications I have just mentioned.

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In case you already have copies of these publications---turn to the months of March and April in the LIVESTOCK CALENDAR and refresh your memory on what ought to be done during the early spring.

It's cheaper to feed a horse than to feed a horse and several thousand parasites. Keep the horse, but get rid of the parasites. Clean up your livestock now and be ready for spring with good, healthy animals capable of pulling the plow in the field, filling the bucket with milk, or putting fat on the back. For further information see your county agent, write your State college of Agriculture or the United States Bureau of Animal Industry in Washington, D. C.

--ooOoo--

CLOSING ANNOUNCEMENT: And so we close another Farm Reporter program broadcast from Station _____ in cooperation with the Federal Department of Agriculture. Drop us a line if you want copies of PARASITES AND PARASITIC DISEASES OF HORSES-----Circular No. 148-C, and A CALENDAR OF LIVESTOCK PARASITES-----Miscellaneous Publication No. 25-MP.

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YOUR FARM REPORTER AT WASHINGTON.

RELEASE, Monday, March 30, 1931.

(NOT FOR PUBLICATION)

Crops and Soils Interview No. 13: NATURE'S NITROGEN SECRETS.

SPEAKING TIME: 10 Minutes.

ANNOUNCEMENT: Your Farm Reporter at Washington today begs to report that he has again been to see specialists of the United States Department of Agriculture. And again he brings us word of some of the work being done to discover some of Nature's secrets in manufacturing plant food ---- And now for the report.

This work I am going to tell you about may mean much cheaper fertilizer for farmers some day. In fact, Dr. F. E. Allison tells me that he has hopes of reaching the ultimate goal which chemists have been striving to attain for the past 40 years. That goal is the production of nitrogenous fertilizers from the air by a process which approximates in cost and apparent simplicity the one used by nature. The final product will be organic nitrogen, the form of nitrogen in most demand by the fertilizer trade and the farmer.

But that's getting ahead of our story -- way ahead. Before we can even think in terms of nitrogen factories and fertilizers we must first thoroughly understand the chemical processes with which we are dealing. Dr. Allison is interested in this more immediate job of searching for nature's secret way of taking nitrogen from the air and fixing it in the soil in a form plants can use. Dr. Allison is engaged in the fertilizer and fixed nitrogen investigations of the Department's Bureau of Chemistry and Soils. His work is to find out, if he can, how those invisibly-tiny, one-celled plants, we call bacteria, do the same thing fertilizer manufacturers need high power, and big factories, and tremendously complex equipment to do.

As you know, plants and animals must have nitrogen to grow properly. It is one of our three chief plant foods. Nitrogen forms part of the air about us. But we need something to gather that nitrogen from the air and put it in a form for use by the growing plants. We need something to "fix" that nitrogen so we can use it.

The lightning in the thunder-storm fixes a little of it, which is brought down in the rain-water. Then way down in Chili, there are big natural deposits of nitrogen salts. Just how they got there, scientists are not yet agreed. But the biggest little fixers of nitrogen are the bacteria which live

in the soil and those which live in the roots of higher plants such as the legumes, and work in partnership with them in fixing nitrogen. Some of the fungi and those low forms of plant life which form the common green scum of stagnant water in lakes and ponds, have also recently been found by Bureau of Chemistry and Soils workers to fix nitrogen from the air.

In general, we may say that nitrogen fixation is going on almost everywhere on the face of the earth where conditions are such as to permit plants to grow normally. And, Dr. Allison roughly estimates that at least 90 per cent of the nitrogen taken from the air is gathered by bacteria in the soil and higher plants; for bacteria are themselves low forms of plant life.

Practically all of the nitrogenous compounds stored up in the soil and organic matter were originally taken from the air by means of these low forms of plant life. And they are also the chief factors in the restoration of the big quantities of nitrogen constantly being lost through leaching, and by wasting away through evaporation, and by the harvesting of crops.

When the nitrogen supply in the soil is lowered by continuous cropping or by other means below the food demands of the plants, we add more nitrogen in the form of fertilizers.

Our supply of nitrogen for commercial fertilizer and for the making of high explosives in case of war used to come from those deposits of nitrate salts in Chili. Then our scientists discovered how to fix nitrogen from the air in the factory. The United States was rather slow in developing a nitrogen industry. But in recent years, we have made fast progress. By the end of this year, Dr. Allison says, the capacity of our commercial nitrogen fixation factories will probably be second only to that of Germany. We are now practically independent as far as nitrogen for either war or agricultural uses is concerned. The nitrogen problem has been largely reduced to a matter of costs.

And there is where this study of the way the bacteria fix nitrogen comes in. Our scientists have made big improvements in their methods of gathering the nitrogen from the air. The nitrogen is now fixed in the form of synthetic ammonia salts by a process which involves high pressures and high temperatures. In short, it still takes considerable equipment and expense and power to do the job.

Yet a single bacterial cell, so small we have to magnify it from 100 to 500 times before we can even see it, evidently has all the equipment needed to fix nitrogen. And we know that the bacteria don't use high pressures and high temperatures. If we can discover the secret of the way the infinitely little plant does it, that discovery may mean big money and a tremendous saving in fertilizer costs.

Dr. Allison says that recent investigations by his laboratory have shown that the tiny bacteria that live free in the soil need practically no energy in fixing nitrogen. Of course, they need some energy in the form of

energy-producing foods to live, just as we all do. But that is about all. They don't seem to need much extra to do their job of fixing nitrogen. If the same principles could be applied commercially, Dr. Allison declares that, no doubt, power costs for nitrogen fixation could be reduced to negligible figures.

Other work has shown that the bacteria need one of the two chemical elements, either calcium or strontium, in order to fix nitrogen; just as at present the manufacturer of synthetic ammonia for use in commercial fertilizers has to use iron with a little aluminum and potassium oxides in it, in order to hasten the formation of ammonia from nitrogen and hydrogen gases.

Fortunately, in nature the calcium the bacteria need in doing their nitrogen-fixing job is either already in the soil, or we make a common practice of adding it in the form of lime.

These discoveries about the ways of bacteria were made on those bacteria which live in the soil itself. But Dr. Allison and his laboratory also have the bacteria which inoculate legumes under investigation. The idea has been that the legume bacteria live in the roots of the plant and fix the nitrogen for the plant in return for their board and keep. It seems now, however, that the actual fixing of the nitrogen is more truly a partnership arrangement than has heretofore been thought, and that both the legume plant and the bacteria have a part in the process.

Nobody can say just how long it will take to find how nature does her apparently highly economical job of fixing nitrogen. The aim of the investigations is neither to use bacteria directly in the commercial fixing of nitrogen, nor to make our nitrogen fixing factories merely large-scale reproduction of the tiny one-celled plants. As Dr. Allison explains it, the work on these infinitesimally small plants is to learn the chemistry or processes used by nature; to get at the fundamental principles, with the view perhaps to applying those principles toward the development of more economical methods in our great new nitrogen industry.

CLOSING ANNOUNCEMENT: It is mighty interesting to know the big possibilities in little things about us. This report is presented by Station_____ in cooperation with the United States Department of Agriculture.
